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MANY of the foreign papers contain descriptions of the illuminated fountains which form so great an attraction at the Paris Exhibition. The idea of throwing colored light upon jets of water is by no means new. Nearly every mountain watering-place has its illuminated cascades for the entertainment of visitors, and at the last three English exhibitions illuminated fountains were very skilfully and successfully shown. The enclosure of the Champ de Mars offering unusual facilities for an exhibit of this kind, the managers of the affair appointed M. Formige, one of the principal architects connected with the Exhibition, and M. Bechmann, the chief engineer of the Paris water-service, to prepare a scheme for lighting such fountains as they might think advisable in the most effective manner. The two gentlemen proceeded at once to England to collect information, and on their return devised the scheme which has been carried out. The fountains of the Champ de Mars are situated in an oblong basin, containing one very large fountain, or group of jets, which can be changed at will, fourteen smaller fountains, and an extensive cluster of jets, surrounding a sculptured group, representing the genius of France in a chariot. The illuminated fountains shown at London and Glasgow had been purely artificial, consisting of jets of water thrown by a powerful steam-pump, which uses the same water over indefinitely, but on calculating the cost of the pumps and motive power necessary for propelling so large a body of water as the experts desired to use at Paris, it was decided that it would be more economical, as well as better, to use a special supply, which was obtained from one of the reservoirs on the Seine, four or five miles from Paris. To illuminate the water instead of simply throwing a ray of light upon it from the shore, as is commonly done, the lights were all placed under the jets, by means of a tunnel, which ran at some distance below the surface of the lake, and was furnished with syklights of thick glass directly under the centre of each fountain. In the tunnel were electric arc-lights of various powers, with reflectors to concentrate the rays in the desired direction. Some of the arc lamps were automatic, of the usual kind, but many were simply pairs of carbons, which were made to approach by hand as they burned away. To illuminate the extremities of the spreading jets, special reflectors were necessary, and this does not seem to have been quite so successfully done as the illumination of the high jets by the lamps directly under them. All the jets, which were in many cases made to turn in various directions, were controlled from a little pavilion near the lake, and from this were sent out by electricity the directions to the workmen in the tunnel. The coloring of the light was also managed directly from the pavilion, by the simple process of connecting a large number of sheets of colored glass together in the form of a chain, which passed between the lamps and the skylights. By arranging the colored panes at suitable distances, the fountains were made to change simultaneously in tint all over the lake, by giving a turn to the windlass which actuated the chain. As a refinement on this, however, subsidiary lamps and colored screens were arranged, so that different portions of a given fountain might be made to show different colors at the same time. In order that the air around the fountains might be perfectly clear of dust, which would otherwise reflect a portion of the light, and show the course of the rays, the fountains were made to play a few minutes before any light was thrown upon them, so as to wash the surrounding atmosphere completely.

A RATHER curious arbitration case is reported in the *Revue Industrielle.* There is a law in France that when arbitrators are appointed, unless the agreement by which they are appointed fixes the time within which they shall render their award, the award must be made within three months after their appointment. In the present case, Mr. A and Mr. B had a difference as to the settlement of an account, and agreed to refer the matter to Mr. C as arbitrator. This was in November. In December Mr. A gave notice that he had concluded not to have Mr. C as arbitrator. Mr. B appealed to the court, which decided that Mr. A could not withdraw from his agreement, and Mr. C went on to inquire into the circumstances, and make his award, which was delivered toward the end of February, more than three months after his original appointment. The award was very unsatisfactory to Mr. A who refused to abide by it, on the ground that it had been made after the expiration of the legal period, and was therefore void. Mr. B claimed that as Mr. A by withdrawing from his agreement, and making it necessary to apply to the court to compel him to keep to his contract, had been the sole cause of the delay, he could not invoke a circumstance brought about by himself as an excuse for escaping from his agreement. The Tribunal of the Seine, however, found that no distinction was made in the Code as to the causes by which the award of an arbitrator might be delayed, and ordered that in this case the award should be set aside as illegal.

A NEW roofing material is mentioned in the German papers, in the shape of a sort of metallic slate, somewhat similar to those used among us but, enamelled so as to be proof against moisture or acid vapors. Metallic slates of tin and galvanized-iron have long been used in Germany, and galvanizing has been pronounced by the highest scientific authority there to be the best protection against rust that has yet been applied to iron, but it is acknowledged that the bending necessary to form the locking joints of the metallic tiles is apt to throw off the protecting covering, leaving the iron exposed to corrosion. In order to provide against the bad effects of this, the new plates are made of sheet-iron, stamped into shape in the usual manner, and are then dipped into an enamel paint which, when heated, forms a continuous coating, unaffected by acids or alkalies. It is too soon to say how long a roof laid with such a material will last, but it promises to be of considerable value.

A VERY interesting discussion took place the other day at a meeting of the Royal Institute of British Architects, following the reading of a paper by Professor Aitchison, on the Roman Baths. Professor Aitchison, who described himself as an old Turkish bather, somewhat familiar with athletics, and still interested in the classical studies of his youth, has made careful examinations of the Roman baths which are still accessible, and, as usually happens when architects study antique buildings, has added much to the knowledge of the subject. According to him, the baths of Rome were at once the exercise-grounds, the music and lecture halls, the public gardens, the club-houses, the picture and sculpture galleries and the places of social enjoyment of the well-bred people of Rome. In his opinion, the use of them as lounging-places, where many persons spent most of their time, was favored by the imperial government, which found it good policy to encourage political discussion in public places, instead of compelling it to take refuge in the secret chambers of conspirators. Both for this reason, and on account of the popularity which followed the devotion of money to this purpose by rich aspirants for political honors, the baths founded by such men as Agrippa, Diocletian and Caracalla, became the most splendid structures of the Roman period. In all of them the floors were of marble mosaic, one of them having had, it is said, steps of gold quartz leading down into the plunge-bath, so that the veins of gold could be seen through the water, while all, except that of Agrippa, had

their vaulted ceilings covered with glass mosaic, after the style of that at Ravenna, and were adorned with the most beautiful Greek statues that could be procured. More than this, recent investigation has shown that they exhibited some methods of construction which had been supposed to be peculiar to modern architecture. For example, the baths of Caracalla contained a room, used for a swimming-bath, which was one hundred and eighty feet long, and seventy-six feet wide, and had a flat ceiling. As the Romans were not accustomed to make their ceilings of furring joists and laths, it has long been a question how this particular one was managed, and the description of Aelius Spartianus, who says that it was "built with latticed beams of bronze, which carried the roof in such an extraordinary way that persons in those days declared that it was then impossible to do anything like it," had not done much to clear up the mystery, until Professor Lanciani, in 1873, having had the basin of the swimming-bath excavated, found in it a great number of fragments of wrought-iron beams, of T-section, with bars of iron of similar section, imbedded in masses of concrete. The appearance of the fragments seemed to him to show conclusively that the ceiling was supported by the T-iron girders, connected, possibly, into some form of truss, and carrying cross-bars, which was afterwards cased with concrete, much as floors are built in Paris. No signs of bronze were discovered, and it is probable that it was used only as a casing over the trusses or girders, and was carried off by the barbarians who plundered Rome during the dark ages of everything in it which seemed to them valuable.

A CURIOUS accident took place in Boston the other day. A wooden house, which had been ordered to be vacated by the Board of Health, had ever since served as a lumber-yard for the poor people of the neighborhood, who replenished their stores of kindling-wood by pulling off the boards and chopping away such of the timbers as they could get at. This process had gone on so far that the more prudent of the wood-gatherers had concluded that their occupation was dangerous, but the more careless ones kept on with their work until, one evening, the building fell on top of them, injuring several. Fortunately, the structure was so frail and light that no one was absolutely crushed, and the sufferings of at least some of the wounded will be alleviated by the reflection that a fresh store of kindlings has been opened to them by the catastrophe.

THE sort of invention typified by the phonograph appears to to have been carried to its utmost limit in a suggestion which was recently made before the French Academy of Sciences. It seems that some one has invented a sort of photographic camera which will take a series of photographs of any object at intervals of one-tenth of a second, and the academician in question proposed that in using the phonograph one of these cameras should be adjusted in front of the person who was speaking into the phonograph, so as to secure a photographic record of the expression of his countenance while the conversation lasted. On sending to its destination the tin-foil sheets of phonographic writing, a proof from the photographic record of the speaker's expression would be sent with it, and on placing the proof in a cylinder, revolving at the same speed as the cylinder of the original camera, the person receiving the message, by placing his eye at the cylinder, and his ear at the phonograph, would be enabled to see, as well as hear, his friend talking to him. Whether this would be an advantage which many persons would prize is a difficult question, but it is not amiss to remember that a slight slip in the synchronism of the cylinder and the phonograph would lead to such horrid results that no one would wish to run the risk of meeting with such an experience a second time. By the way, it seems to us a little strange that no one has yet utilized the phonograph as a piece of theatrical property. Even among the novelists, we do not know that a phonograph has yet led to the detection of a criminal, or the rescue of a heroine from inevitable death, or the reconciliation of an estranged pair, and on the stage such a contrivance would be tenfold more effective than in the pages of a book. We think we could offer some valuable suggestions ourselves as to the construction of a phonographic plot, and commend the subject to the attention of dramatic writers.

THE *Schweitzerische Bauzeitung* describes the new Chinese railway from Tientsin to Kaiping, and gives an account of the way in which the right-of-way was secured in difficult cases, which appears to be not without its merits. The line is about ninety miles long, with a single track, and is equipped in the most primitive fashion. The signals consist of flags, which are waved by the station-masters, and the setting of the switches and the other operations of traffic are performed in a similar way. For all this, the road is well patronized, and does a large business at profitable rates. The trains consist of both freight and passenger cars, together with cars which partake of both qualities. The first car after the engine is the second-class car, and consists of a long, narrow vehicle, divided longitudinally through the middle. The passengers enter at the ends and arrange themselves on long benches, two of which run along the sides of the car, while the other two are set with their backs against the central partition, like a double horse-car. Next to this car, which is used by the small merchants and persons of similar rank, comes the third-class car, which consists of a large box for baggage and freight, surrounded by a bench, and covered with a roof of tarred felt. The first-class car brings up the rear, and is simply an ordinary American car. The road is well built, and the bridges are particularly well designed, being arranged, also, for receiving a double track at some future time. In regard to the way in which land damages were settled, one of the native Chinese papers tells a little story: In the district of Tichia, near the Tientsin River, dwelt three proprietors, named Haw, Li and Pheng, whose land was crossed by the line of the proposed railway. Like many more civilized proprietors, these gentlemen refused to accept the liberal price offered them by the railway officials for a right-of-way across their territory, and demanded more. Finding their representations unavailing, the railway directors referred their antagonists to the local magistrates, who were equally unable to persuade them to reduce their demands. The higher authority was then appealed to, and an energetic official despatched to the spot. He saw the three gentlemen, presented the case, and begged them to reconsider their determination, but to no purpose. He then called in the assistance of the secular arm, and ordered Pheng to be seized and treated with one hundred blows of the bamboo. After this he was set up in the stocks, with a log of wood chained to his neck, and was told that he was to remain there for three days, and if at the end of that time he remained unconvinced by official reasoning, more severe measures would be resorted to. Before the three days had elapsed, however, he had changed his mind as to the value of his land, and consented to convey the right-of-way in return for the sum offered him, and his two friends, who had witnessed his experiences, concluded that a similar arrangement would, on the whole, be satisfactory to them.

WE have become somewhat callous to the complicated perils that surround our daily life in large cities. As we walk through the streets we are forgetful of the fact that at short intervals there are stored under the sidewalks boilers enough to annihilate any city by their simultaneous explosion. We no longer hesitate to take into our buildings for heat and power that gigantic servant superheated water, of the real strength of whose fetters we are really ignorant. We bring water to our cities from huge reservoirs the failure of whose walls may wipe out of existence, lives and property of untold value, and we trust to the pressure of an inch or two of water-seal to keep pestilence from reaching our dear ones from the sewers. It is a happy-go-lucky age, but experience is every day teaching us that no safeguard can be neglected in controlling even well-known forces. Just now she is showing us how wily and unsubjugated a slave is electricty, and her lessons are enforced with hard blows, death, fire and destruction. Now a heavy man-hole cover is hurled into the air because gas collected in a subway has become ignited by a spark; now some unfortunate is shocked to death because he has unwittingly touched a live wire, and now one's house is burned down because a live wire has crossed the wire of the ubiquitous domestic telephone. The explosion in the new Fisk Building, Boston, this week, which inflicted serious injuries on several occupants, is a new manifestation of its untamed savagery. In some way gas had escaped from the pipes and filled the spaces in the hollow-tiles between iron floor beams. A cross-circuiting of the wires even if it did not, as some assume, cause the leak seems to have given vent to the spark that ignited the gas and caused an explosion violent enough to partially wreck two floors.

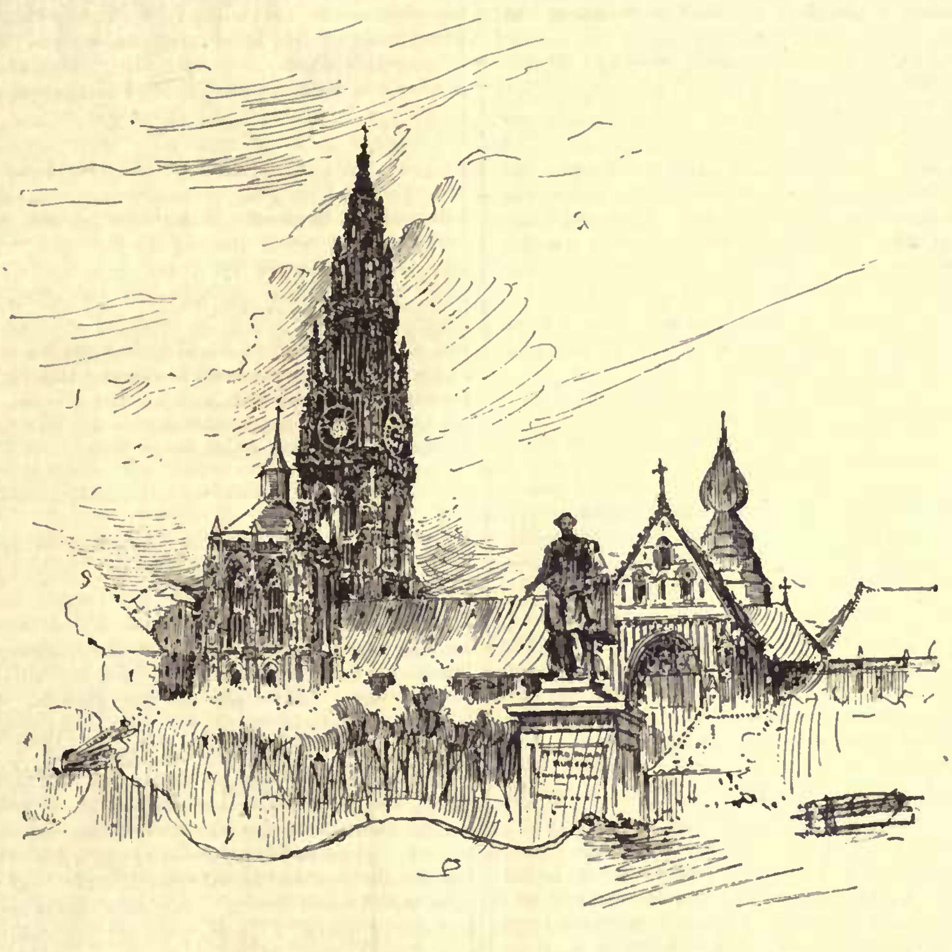
AN ARCHITECTURAL KNOCKABOUT. — I.



I LEFT New York on the morning of the 17th of December, 1887. The weather was cold and clear. I had come aboard the ship the night before — or, put it, well into the morning; for I had been tendered a farewell dinner by my brother-draughtsmen, which was of a convivial nature — as artistic dinners are apt to be.

I had embarked on the good ship "*Westernland*," of the "Red Star" line, for Antwerp, and it was my intention to land there and then proceed on through Belgium and Holland. Nothing can describe the mingled feelings that assailed me as we cast off from the pier and dropped silently down the North River with the friendly aid of a tiny tug-boat. My travelling experience was at that time extremely limited, being confined mainly to the areas of Massachusetts and New York State. As we moved out into the ocean, I wondered how it would all end, and if there was actually any other land in the world than that shown in the splendid panorama spread out before me, which I was then viewing from the after-deck of the steamer.

Almost simultaneously with our departure, four or five other steamers of the various lines got under way, and the stately progress of these great ships with their different national colors displayed, made one of the most beautiful lights I have ever seen. They tell me that a traveller's first impressions of such scenes as these are never equalled in the future. Perhaps that is true; in my own case, they were certainly unique.



After we had gotten out of the harbor, our little tug-boat left us, with a *bon voyage* from the deck, and our mighty vessel moved rapidly away, propelled by its own great strength. I watched the fast-disappearing land for a long time, and it was with a feeling of sadness that I waved a farewell to my home and country. I then resolved to "brace-up," and immediately proceeded to examine the internal arrangements of the vessel which was to be my ocean-home for ten days.

Approaching the "Banks" it grew rapidly rough, and I had opportunity soon enough to test my sailing-qualities. They proved good — really quite too good — as no one but myself appeared for a long time on deck, and I almost believed that the captain and I were running the ship alone. Gradually a few sad men appeared on deck, whom I did not, of course, know; but that was no drawback, as no one requires a formal introduction on board ship, where there are so many opportunities for contact. The sympathy for illness — the rushing after, and rescue of, a lady's hat — the preservation of a galloping steamer-chair with its fair burden — are but a few of the many chances for acquaintance which a man has on board an ocean-steamer.

It was impossible for me to be seasick, although I tried to bring it about from sheer loneliness. I did the most daring things. I ran about the decks while they were at an angle of forty-five degrees, and every ocean-traveller who has experienced the miserable feeling of trying to walk or run on a level deck which suddenly rises or falls before him, will agree that it usually accomplishes the result I desired. Then I hung over the railing and suggestively gazed into the seething waves, but still with no nauseating effect. So I gave it up. Time went on, and I soon knew everybody. We numbered only sixteen first-cabin passengers, as this was the least favorable time of the year for a voyage, but there were some interesting people



among them. To begin with, a gentleman and his wife with two pretty daughters (which fact I was not slow in discovering when at last they appeared on deck). Then there was a railroad superintendent and his wife, a ship-owner and his wife also; and a dear old lady, a native of Bruges, who had been to America to close the eyes of her only son, and to see him laid to rest on a foreign shore. She was very kind to me, and taught me French, to my constant embarrassment, for the lessons were all given at the table in the presence of all the other passengers. She would ask me the most awful questions, using the most idiomatic of idioms, and keep it up until I made some sort of answer, to the amusement of the whole saloon. She was a great help to me, however, and I shall never forget my friend from Bruges, who used to tell me that I reminded her of her lost boy. We also had with us a jolly minister from Boston with his wife and child — that child, by the way, was rescued from imminent danger of the briny deep by every individual person of the ship's company, at odd intervals. We had, moreover, a large percentage of the artistic element, as there were two brothers, young architects from Rochester, who were going abroad, as I was, for study and sketching. With these I soon struck up a great and, I hope, a lasting friendship. Then last, but as we soon discovered, not least, was a New York *Herald* reporter of the traditional type, who ate most of the time, and smoked scented cigars all the rest. However, he too became one of "our family," and his stories of the heroic deeds he had performed in order to get items for his paper, were worthy of a monument, every one of them. It was a jolly party when finally they all got well enough to sit up and smile faintly. The pretty girls were kind to us, and we (the architects) did our best to amuse them. We drew caricatures, sketched the sailors, drew in their albums — the same old story — and generally made ourselves as agreeable as we knew how to be. We had all been given the "liberty" of the ship, and in that great "*Westernland*" the sixteen cabin-passengers seemed almost lost on the huge decks; but, on the fifth day out, everything, without permission, took the "liberty of the ship," indeed.

I shall never forget that night! We had run into the tail-end of one of those terrible winter storms, and it was fearfully rough. The ship seemed fairly to stand on end. Her bow plunged far down into the sea, while her stern emerged as much in the air. Her great screw, released from the pressure of the water, whirled about with the most soul-stirring noise imaginable. I can see myself now, clinging with both hands to my berth, while my portmanteau, tooth-brush, boots, and indeed, everything movable I possessed, was flying about the room. Then the rolling! One motion at a time is quite sufficient for misery, but when one undergoes the roll and the pitch simultaneously, one asks oneself, why one was born. However, we survived the discomforts of the night, but it was, for me, with the loss of several articles of apparel which I was never able to find afterwards, even when the ocean became more tranquil.

We proved to be badly out of our course, and the captain informed us that it was doubtful if we should reach Antwerp for seven or eight days more. This was disheartening, but one has to accept the inevitable on such occasions, without a word of protest. The next evening, all who were able assembled in the smoking-room. We had expressly requested that the ladies might share our quarters there, provided they would submit to the tobacco-smoke. They acceded to this proposition instantly, and we tried to amuse them by songs and stories, but it must be confessed that our efforts were not all successful. It was the night before Christmas. The day had been rainy and stormy, just the sort of weather to make any one miserable who was away from home on that great festival. To say that I was homesick, would be putting it mildly, and every one seemed to share my feeling. But something had to be done to relieve the universal gloom that pervaded our company, and I had pondered within myself all day to devise something to raise our spirits. At last I hit upon a scheme which I modestly thought might accomplish this object, and it was on this evening that I distinguished myself, though I felt as if I should extinguish myself at the same time.

I am, every now and then, gifted with a slight ability to caricature people and things, and am at those times filled with a desire to be funny, although it is hardly necessary to say that I am not always entirely successful. The scheme I had thought of, to act as a "starter" to the assembly, was to give an amateur lecture on caricature. My knowledge of the history of this art was somewhat limited, but I considered that nothing mattered in the face of the desperate depression which pervaded my prospective audience. The great Hogarth was to figure as my grand *coup*, and I rushed to my state-room and wrote a little essay, making it as ridiculous as I could. I prepared, also, some sketches of all of us, with caricatures of our dress and manners. I then went to the captain, told him my plan, and asked his advice. He thought it a noble scheme, and was really glad to have some sort of celebration to wake us all up; so he promised to supply me with a black-board, and agreed to grace the assembly with his presence. At dinner he announced that "our young friend," etc., would give a little entertainment in the smoking-room on this, the night before Christmas, and that a full attendance was desired. This pleased the passengers very much, and, accordingly, there they all were, as many as were able.

At eight-thirty, then, I rose, feeling very much embarrassed. The captain, in full uniform, and all the company in their best clothes, gazed at me with the most extravagant expectations, and I began to speak, somewhat in the following words: "Ladies and gentlemen, I really do not know what I am talking about, but, owing to the state of the weather and the apathy into which we have all fallen, and considering that this is Christmas Eve, I have resolved to sacrifice myself and my feelings to your amusement, even at the risk of being thrown overboard. So here goes!" (Applause.) I then attempted to give a little history of the art of caricature, so far as I knew it; then proceeded to show how we all caricature ourselves in our speech, manners and dress, drawing on the black-board quickly as I talked. My remarks being met with the most flattering applause, I continued speaking just as the ideas occurred to me, meanwhile watching my audience narrowly to see how much they would stand. I made my great point when I caricatured the ship's course, amidst the roar of the passengers and the hearty laughter of the captain, who rubbed his hands in glee, as if he enjoyed beating around on the ocean "just for fun" in December. Finally, I ended my lecture by saying: "All things in the world can be caricatured. No," I interrupted myself, "I make a mistake. There must be an exception to every rule; and, as I look around the room here at the ladies present, I see without question that true beauty can never be caricatured." Whereupon I made a rapid sketch of the two pretty girls from a little drawing of them both that I had captured once when they were reading. This hit was very well received, and I retired on my laurels. The captain behaved splendidly, and ordered up the most elaborate of suppers, topping the whole thing off with some delicious Welsh rare-bits. Then we all wished each other a good-night and a merry Christmas and retired. The next morning the steward woke me early to present me with a pipe, a box of cigars and several other things from "the grateful passengers." It was most kind of them, and I appreciated it greatly.

After this everything seemed to brighten up. The weather got better, and the pretty girls seemed to be kinder. As to the latter, we three architects were compelled to resort to a private arrangement of our own to insure a fair division of the spoils, which was usually the tossing up of a lucky quarter. (They used my quarter generally, and, strange to say, it seemed to know its owner pretty often.) We were able to play "ring-toss" on the deck, and on one day we had a "cake-walk." I will not say who won, except that one of the pretty girls was "in it." One night I shall never forget. The moon was shining brilliantly, and the air was just balmy enough to be harmonious with the moon. We "young things," as the rest called us, were sitting out on a tarpaulin-covered hatchway at the stern of the ship. (I must be allowed to remark that the reporter was not allowed in this moonlight group; we were three men to two girls as it was.) Then we began to sing. The two girls sang beautifully, and when we fellows joined in with bass, baritone and tenor, we thought the harmony delicious. What could have been more beautiful altogether than the effect of our great ship then? We could see the whole length of her as her bow rose slowly and grandly, far, far up on one of the long ocean swells, while the rolling sea all around us caught and reflected the soft moonlight. The voices of



the girls blended sweetly with our deeper masculine tones, and we all enjoyed ourselves thoroughly, while our elders listened and looked on with smiling approval. The jolly Boston minister made himself distinctly famous by singing to us a song of the most melancholy nature, which he rendered quite tragically, weeping at all the affecting parts It was a gruesome tale about "Gorging Jack and Guzzling Jimmy, and no one else save little Billee," and, when we had learned to join in the chorus with the same pathetic feeling, we sang it on every possible occasion.

One night we sighted the faint light of an America-bound steamship — so strange a sight out there in that great expanse of water. The captain wished to ascertain her name and line, so he gave orders to signal her. We displayed three red fires — one at the bow, one at the stern and one amidships — and kept them there until they burned out. Soon we saw an answering signal, and, although it was so far away that it was hard for us to distinguish the number or the color, the captain informed us that she was one of the North German Lloyds.

Our stewards on the "*Westernland*" had a clever trick for awakening us in the morning if we showed a tendency to remain late in our berths. They would rush down the passages, shouting at the top of their voices: "Whale! there she spouts!" At this we would jump up wildly, drag on our clothes, and rush madly on deck — to meet a bland "Good-morning" from some one of the officers,— whale nowhere to be seen. On Monday the shouts would be, as I have said, "Whales!" on Tuesday, "Sharks" or "Porpoises!" on Wednesday, "Steamer dead on!" But, as we were fourteen days on the water, their *repertoire* was soon exhausted, as well as their success.

About the twelfth day out, I knew so well what we would have for dinner that I could tell any one of the *menus* for a certainty long before the meal was served. It was very monotonous, for a ten-days' provisioning does not "pan out" very well for a fourteen-days' voyage. At last we sighted land. Ah! the excitement of that moment! I shall never forget it, nor the taking aboard of the pilot, who put his right leg over the railing first, of course, because I had bet that he would put the other.

How strange and interesting that faint little streak of foreign land looked to me as I traced it first away off on the horizon! But it rapidly grew plainer and plainer as we steamed on, until we sighted the Lizard, and felt that we were indeed at our journey's end. Soon after, crowds of fishing-smacks sailed around us. How quaint these staunch litttle craft looked! We were then in the English Channel, and the water had changed from a dark green color to a chalky brown. The shores of France were close upon our right hand, and I gazed upon them with the greatest ecstasy.

After some hours we reached the mouth of the Scheldt, where we came to anchor opposite Flushing. I looked and wondered at everything, at the strong dykes along the shores of the river; at the low, flat country beyond, which seemed to be on an exact level with the sea. We had arrived at the mouth of the river at dusk, too late to make the trip to Antwerp that night, so we stayed there at anchor,

close to the land. Everything was covered with snow, and when the moon rose, its light was reflected back from the white thatched roofs of the quaint little houses, until they were transformed into glistening silver. There before my eyes I saw at last the real Dutch windmill, — how strange and unique the whole scene was! If any one wishes to get a first impression of Old Europe that is especially quaint and curious, let him land at Antwerp.

We sat out on deck that evening, watching the beautiful sight, each one a little sad, as we realized the voyage was over and we might never meet again. We had made strong friendships on board the "*Westernland*," and I know that to two of our party at least, the parting was the cause of real pain. I don't think the reporter cared much, however, as he tried his best to get off the ship and go up to Antwerp by rail. He was "five days late there already" he said, but the captain told him it was impossible, so he was perforce obliged to remain on board a little longer.

We three architects took our tender leave that evening from the fair friends we had made on the voyage. This time we didn't "pitch up" for first chance, but each told his little tale of regret and hope as he found the opportunity. Then the ladies retired, but we fellows sat up on the deck, smoking our pipes, and scarcely exchanging a word, until very late in the night.

The next morning, with our luggage packed and ready to be taken off from the ship, we were all up early to watch the ascent of the river. The Scheldt twists and turns in every conceivable direction, and it is no light task to navigate a great steamer up the narrow channel. She had to be constantly turned about, backed, and started on again, in order to accommodate her length to the various bends in the stream without going through a dyke or two, or committing other damage. The whole scene was strange and interesting to me. We were often near enough to the banks of the river, which were bordered with little low, thatched huts, to halloo to the peasants who stood on the dykes waving their visored caps at us. We could even distinguish their faces, and notice their peculiar dress and great wooden *sabots*. It is here particularly that one sees the real Dutch peasant, whose striking costume differs greatly from that seen in the cities.

Before long we came in sight of the great city of Antwerp dominated by the tall spire of its cathedral, high upon which is a great clock-face. When we reached the dock, crowds of people were there awaiting the arrival of the ship, and I saw then my first foreign soldier, and my first custom-house officer, with his resplendent uniform.

The landing was soon over. Farewells were softly said, adieus were waved to the captain and officers, last looks bestowed upon our noble, salt-covered ship, and our little knot of newly-formed friends was untied. We three architects went together to the Hôtel de la Paix, but the rest of the passengers left Antwerp that night for other destinations, as the undue length of the voyage compelled them to hurry their movements. After being comfortably installed in our rooms at our hotel, we indulged in the first "square meal" that we had had for a fortnight; which gave us an opportunity for airing some very bad French, and also for talking over at our leisure our past experiences and future plans.

We had arrived in Antwerp on the first of January, and we realized our good luck when we were told that this day was celebrated as one of the greatest festivals of the year. Accordingly, feeling much better after our dinner, and wishing to have one more "good time" before we went our different ways, we decided to go to the great annual smoking-concert and masked ball, which took place this night at the Opera-house.



This was a sight worth seeing. There was a variety show first, the actors in which were all either French, or Americans, the latter appearing on the bills as "les petits Washingtons." When the ball was opened and masses of white-robed figures thronged the floor, walking, dancing, or coyly fleeing from their pursuers, we took seats in the gallery which ran the entire length of the house, and leaned over the railing to watch the proceedings below us, being invited from time to time to join the dance. This dance was the "Flemish waltz," which was like dancing on stilts, although it looked easy enough to learn: the men held their partners at arms' length, and went silently "stilting" around and around, always in the same direction, never reversing.

We were presently besieged by a crowd of robed-figures — whether male or female it was impossible to tell — and informed in French that on this night it was not "etiquette" to refuse to dance. So, calling to the other fellows to "whoop it up," I seized the white mass that looked the most feminine, and plunged into the dance. I stilted on bravely until my head reeled, and things about me manifested an unwonted circularity. Then I was supported to my seat and endeavored to talk German and Flemish to my partner, but as my knowledge of either language was extremely limited; I could do nothing better than ejaculate at intervals, "*Dŭ bist verüeht, mein kind, dŭ müsst nach Berlin*," or "*zwei bier*." I could not carry on a very extended conversation, naturally, with this vocabulary, but I did better in French. My companions evidently were in the same fix. I could see them panting in different parts of the room, having tried the waltz, and making now the most extraordinary gestures and grimaces as they conversed with their foreign and unknown partners. At twelve o'clock, amidst a most tremendous crash of music, all ranks were levelled, according to old custom. Rag-pickers became the equals of princes, and boot-blacks might kiss queens. Although I was neither queen nor boot-black, I did not escape, nor did my friends, the salutation of many excited, white-robed figures, all of whom we dearly hoped were queens. This wholesale osculation is by no means restricted to the fair sex, as their sterner opposites passionately embrace their brothers at this annual festival. Finally we got together and escaped to our hotel, passing on the way crowds of masquers walking with linked arms, all singing at the top of their voices the then popular "Boulanger March."



Having recovered, the next day, from all the effects of the ball the night before, we sketched some quaint old Dutch gables together, bowed in reverence before the shrine of Rubens, admired the grand cathedral and all its beauties, and then took a long farewell from each other. I left that afternoon for Rotterdam in a third-class carriage.

It was misty, but not very cold at first, with very little ice on the canals, but on arriving at Rotterdam it began to grow sensibly colder. By this time, I was becoming used to the bothersome assiduity of the guides at all corners; so upon arriving, I calmly ignored the vociferations of the excited crowd about me, and as I knew nothing of the way to my hotel, I stood with my luggage between my feet for safe-keeping quietly surveying the mob, until I had picked out the oldest and least anxious one among them, to pilot me to my destination.

[To be continued.]

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

DOORWAY TO HOUSE OF DR. F. C. SHATTUCK, MARLBOROUGH ST., BOSTON, MASS.

[Gelatine Print, issued only with the Imperial Edition.]

TOMB FOR AN ILLUSTRIOUS ARCHITECT DESIGNED BY MR. JULIUS HARDER, NEW YORK, N. Y.

THIS design was awarded an honorable mention in a competition held by the Architectural League of New York.

THE WILLIAMS INSTITUTE, NEW HAVEN, CONN. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

DESIGNS FOR A COAL OFFICE SUBMITTED IN A COMPETITION OF THE ROCHESTER SKETCH-CLUB BY MESSRS. W. H. ORCHARD, C. F. BRAGDON AND E. S. GORDON.

DESIGNS FOR A GATE-LODGE SUBMITTED IN A COMPETITION OF THE BOSTON ARCHITECTURAL CLUB BY MESSRS. T. F. WALSH AND W. T. PARTRIDGE.

DESIGN FOR A CLOCK TOWER SUBMITTED IN A COMPETITION OF THE T-SQUARE CLUB OF PHILADELPHIA, PA., BY MR. FRANK A. HAYS, PHILADELPHIA, PA.

HOUSE ON FIFTH AVENUE, NEW YORK. MR. W. H. BEERS, ARCHITECT, NEW YORK, N. Y.

ARCHITECTURAL SHADES AND SHADOWS.[1]—V.

CHAPTER V.

Methods and rules for drawing the shadows cast upon planes of projection by figures composed of principal lines and principal diagonals; discussion of the square, "lozenge," and octagon; their shadows and diagonals; the circle and its shadow; length and inclination of the axes of the ellipse of shadow; drawing the shadows of solids without knowing their lines of shade; notes on the octagon, shadow of circle and ellipse.

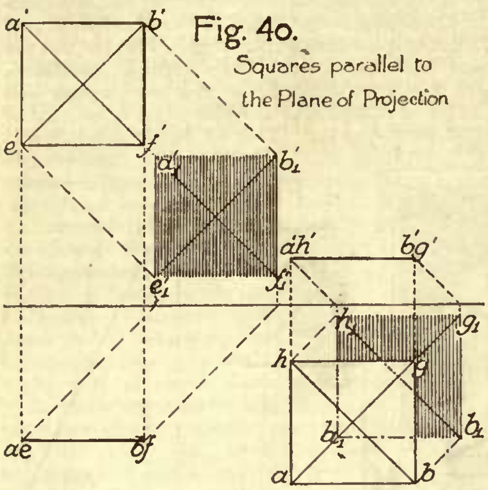


Fig. 40. Squares parallel to the Plane of Projection

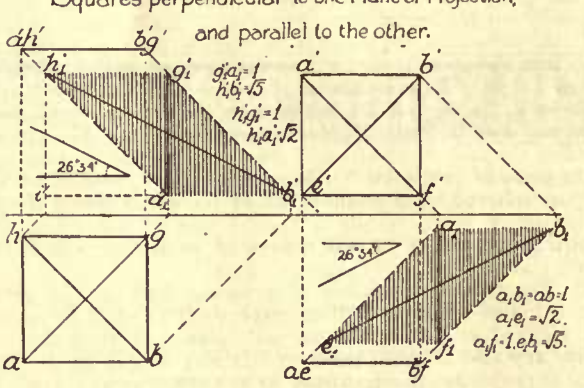
46. A square bounded by principal lines must occupy one of three positions relatively to a plane of projection. It may be (*a*) parallel to it, and, consequently, perpendicular to the other plane of projection; (*b*) perpendicular to it, and parallel to the other plane; or (*c*) perpendicular to both. Its shadow in each of these positions, cast upon the plane of projection or a plane parallel to the latter, may be stated as follows, the length of the side of the square being taken as unity:

a. Square parallel to a plane of projection. Its shadow is a square equal and parallel to itself; and the shadows of its diagonals (in other words, the diagonals of its shadow) are equal and parallel to the diagonals themselves (Figure 40).

b. Square perpendicular to one plane of projection and parallel to the other. Its projection on the former plane is a horizontal line; its shadow a parallelogram bounded by two horizontal sides equal to the sides of the square (*i. e.*, to 1), and by two lines at 45° to *G L*, shadows of sides normal to the plane of projection, and equal to the diagonal of the square, or $\sqrt{2}$. Of the shadows of its diagonals, one is a vertical line, whose length is 1, and the other a line inclined

Fig. 41.

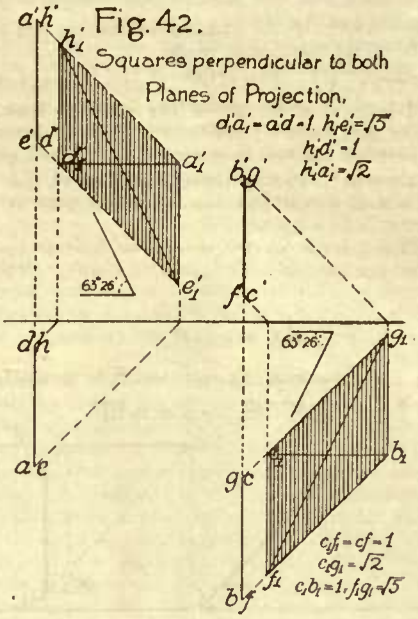
Squares perpendicular to one Plane of Projection, and parallel to the other.



to *G L* (and hence, also, to the projection of the square)[2] at an angle whose tangent is ½, or 26° 33′ 54.″ The length of this diagonal (as $h'_1b'_1$, Figure 41) is equal to $\sqrt{5}$; for evidently $h'_1b'_1$ is equal to $\sqrt{(b'_1i')^2+(h'_1i')^2}=\sqrt{1^2+2^2}=\sqrt{5}$, because $b'_1i'=2a'_1b'_1=2$. The vertical height of the shadow is 1, and its extreme length 2. These relations are shown in Figure 41.

c. Square perpendicular to both planes of projection. Its projection on either is a vertical line, and its shadow a parallelogram bounded by two vertical sides equal to the side of the square or to 1, and two at 45° to *G L*, shadows of the sides normal to the plane of projection, and equal in length to a diagonal of the square or $\sqrt{2}$. Of the shadows of its diagonals, one is horizontal and equal to 1, and the other is inclined to *G L* at the angle whose tangent is 2, or 63° 26′ 4″, its length being $\sqrt{5}$. Its inclination to the projection of the

Fig. 42. Squares perpendicular to both Planes of Projection.



square is evidently the complement of 63° 26′ 4″, or 26° 33′ 56″. The horizontal width of the whole shadow is 1, and its extreme height 2 (Figure 42).

47. The first case, *a*, falls under Rule (II); *b* and *c* may be included under one rule, being in reality only variations of the same case, which may be thus stated, the shadow being supposed to fall on the plane of projection itself, as explained in 37.

(*IV*) *The shadow cast upon a plane of projection by a square composed of principal lines, and perpendicular to one or both planes of projection, is a parallelogram bounded by two sides equal and parallel to the projection of the square, and by two sides inclined at 45° to G L, and equal to the diagonals of the square. Of the shadows of these diagonals, one is equal and perpendicular to the projection of the square; the other is inclined at an angle of* 26° 34′ *to the projection of the square, and is equal to* $\sqrt{5}$.

In *b* and *c* alike, one extreme dimension of the shadow is 1 and the other 2; it is composed of two half-squares, and its area is equal to that of the square itself.

48. The dimensions and direction of the shadows of the six principal diagonal lines have been given as a part of the discussion of the square in 46. They are separately shown in the annexed figure, where the letters indicate the direction of the lines according to the system used in Figures 30 and 31. These lines are sufficiently important to warrant the separate enunciation of the length and direction of their shadows in the following rule:

(*V*) *a. Principal diagonal lines parallel to the plane of projection cast shadows upon that plane equal and parallel to themselves.*

b. The projection upon one plane of projection of a principal diagonal parallel to the other plane is a horizontal line. When the right-hand end of the diagonal is the one nearest the former plane its shadow upon it is a vertical line, equal to the projection of the line itself. When its left-hand end is the one nearest the same plane its shadow is inclined at 26° (*nearly*) *to G L, its left-hand end being farthest from G L. Its length is equal to* $\sqrt{5}$, *the* projection *of the line being taken as unity.*

c. The projection upon either plane of a principal diagonal lying in a plane normal to both is a vertical line. When the lower end of the diagonal is the one nearest to V′P, the shadow upon either plane is a horizontal line equal to the projection of the diagonal itself. When the upper end is the one nearest to V′P, its shadow upon either plane is a line at 63° (*nearly*) *to G L, the left-hand end being the farthest from G L, and its length is* $\sqrt{5}$, *the projection of the diagonal being taken as unity.*[3]

49. *The Lozenge.* This is the square set cornerwise. When bounded by principal diagonal lines, its diagonals are parallel to the sides, and its sides to the diagonals of the "principal" square in corresponding positions. Its shadow may be drawn by casting the shadows of its diagonals (the latter being principal lines) and connecting their extremities. The lozenge bounded by principal diagonal lines may occupy either of three positions relatively to a plane of projection: it may be (*a*) parallel to it; (*b*) perpendicular to it and parallel to the other plane; or (*c*) perpendicular to both. In the last two cases its projection is a straight line, parallel to *G L* in the former, and normal to *G L* in the latter. As in the case of the square these two positions were included under one rule, they will in this case be treated together, the side of the lozenge being taken as unity. Its rectilinear projection must, therefore, be equal to $\sqrt{2}$.

50. *a. Lozenge parallel to plane of projection.* Its shadow is a lozenge equal and parallel to itself, and its diagonals cast shadows equal and parallel to themselves, according to Rule (II).

(*VI*) *b and c. Lozenge perpendicular to one or both planes of projection. Its shadow upon the plane to which it is perpendicular is a parallelogram bounded by two sides perpendicular to the projection of the lozenge, and equal in length to half that projection or to* $\sqrt{\frac{1}{2}}$

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[1] By A. D. F. Hamlin, Instructor in Architecture in the School of Mines, Columbia College. Continued from page 222, No. 698.

NOTE.—[In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

H P = horizontal plane of projection; *V′ P* = vertical plane of projection; *G L* = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow: small figures above the line indicate points of shade. Greek letters (α, β, γ, θ, δ,) designate angles. The *diagonal* of a line or dimension is its length multiplied by $\sqrt{2}$.

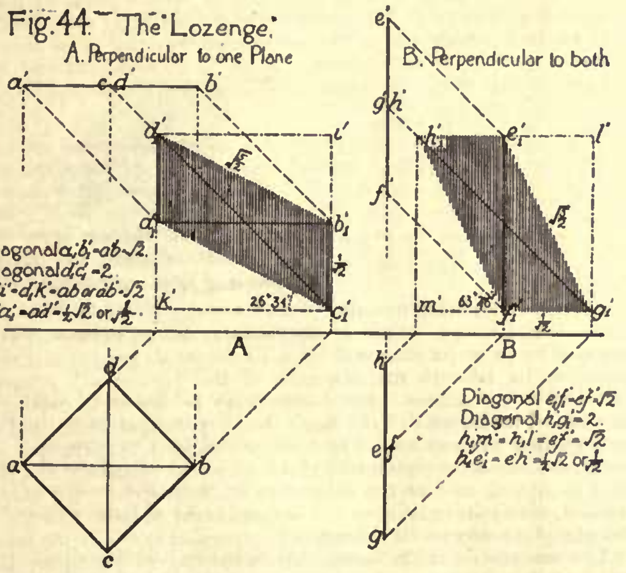
[2] There are, of course, two projections of the square. But in these discussions the projection referred to, unless otherwise specified, is always the one upon the plane which receives the shadow, whichever that may be in any particular case.

[3] If the length of the diagonal itself be taken as unity the length of its shadow in *b* and *c* is found by multiplying the length given in the Rule by $\sqrt{2}$.

and by two sides inclined at an angle of 26° 34′ to the projection of the lozenge, and whose length is $\sqrt{\frac{1}{2}}$. *Of the shadows of its diagonals, one is equal and parallel to the projection of the lozenge, its length being, therefore,* $\sqrt{2}$; *the other is inclined at 45° to G L, and is equal to 2.*

The extreme height and width of the shadow of the lozenge are each equal to the length of its rectilinear projection, and hence to the length of its diagonals, or $\sqrt{2}$. Inspection of the figure shows the fact, easily demonstrated by plane geometry, that the area of the shadow equals one-half the square constructed upon the projection or diagonal of the lozenge. Since this square must equal $\sqrt{2}^2$ or 2, the area of the shadow is 1, and is, therefore, equal to that of the lozenge itself, as the analogy of the square would lead us to expect.

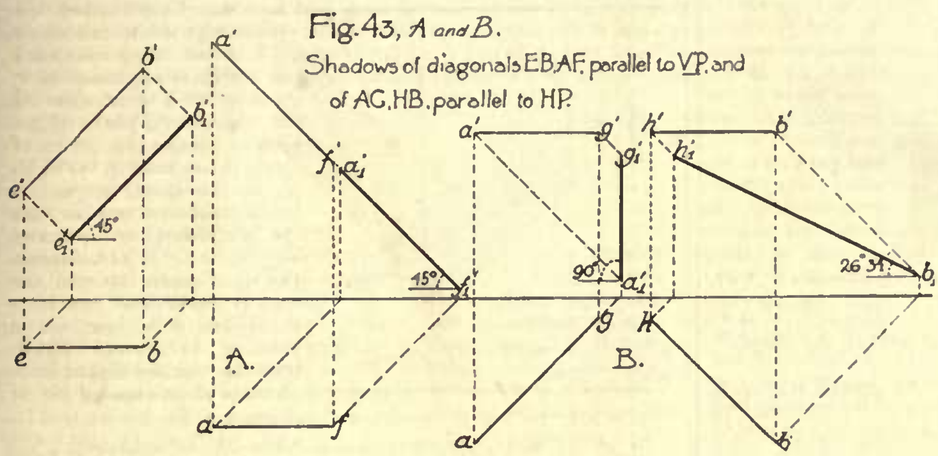
51. *The Octagon.* This occurs so frequently in architectural forms that its geometric relations deserve careful attention. They will be briefly explained in a note to this chapter, with hints for its easy and correct construction. It appears wholly or in part as the basis of the forms of pavilions, bay-windows, oriels, turrets and towers, and in the plans and sections of many minor objects like newels, piers, chamfered posts, etc. As it commonly occurs with its sides alternately in the position of principal lines and of principal diagonals, and, as furthermore, it furnishes the most convenient means of drawing the shadow of the circle, it is proper to note with care the form and properties of its shadow. This the student is advi ed to construct in the three positions corresponding to *a*, *b* and *c* in 46 and 50, by means of the rules given for shadows of principal

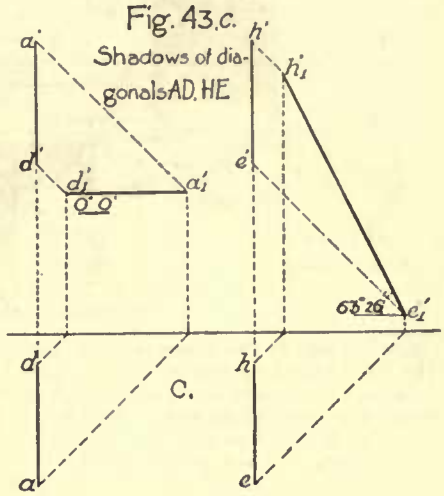


and diagonal lines, as well as by direct projection of points. The following discussion will be thereby rendered clearer, and its statements easier to remember.

52. In dealing with the line normal to a plane of projection, with the square, and with the lozenge, the rules for drawing the shadows have all been so expressed as to apply in each case equally to either plane of projection without reference to the other. That is to say, the shadow can in each case be constructed by means of one projection alone of the figure, provided only its distance from the plane of incidence be known; and where this is not known, it is the only fact or dimension for ascertaining which the other projection of the figure is required. This method of stating the rules will, therefore, be found convenient not only because of its comprehensiveness, but also because in a large proportion of the cases occurring in practise, it enables us to cast the shadows on an elevation without having to refer to the plan, and *vice versâ;* while in many other cases it is only necessary to refer to the plan for the determination of a single point or dimension of the shadow on the elevation, all the others being easily derived from the latter by the rules. The same method of statement will be followed in all cases where the form and dimensions of a figure, plane or solid, can be ascertained from one projection without referring to the other. The explanatory figures in the text will show both projections of the figure and of the rays passing through its principal points, thus enabling the reader to verify by inspection the statements made in the discussion and in the rules; but the practical application of the latter will make evident the saving of labor effected by dispensing in each case with one of the two projections of the figure casting the shadow.

The reader is further reminded of the simplification of statement mentioned in 37[1], and again in 47, which results from supposing the shadows to fall upon the plane of projection. As a matter of fact, in any one drawing they may fall on a great variety of planes, of which, however, a large part are parallel to the vertical or to the horizontal plane of projection. But the plane of projection may be arbitrarily assumed to coincide with each of these planes in turn, the trace of the plane of incidence serving as the new ground-line, since the projections of an object are not altered by moving the vertical plane of projection forwards or backwards, nor by raising or lowering the horizontal plane. A vertical wall parallel to the picture-plane is represented in plan by a horizontal line, which may be used as the ground-line in finding the shadows cast upon that wall. Similarly any horizontal plane receiving a shadow may be taken as *HP*, the horizontal line which is its vertical trace, and which represents it in elevation, being used as the new ground-line, whatever its actual height. This statement of an obvious fact will assist the beginner in tracing out the shadows on the various surfaces of the steps and door in Plate II, No. 5, and the window No. 11, besides avoiding the useless repetition of the words "or on a plane parallel to the plane of projection." When such planes, parallel to *VP* or *HP* are referred to, they will be called *coördinate planes*, the planes of projection being merely a special case of coördinate planes. Planes perpendicular to both planes of projection will be called *profile* planes.





53. The octagon composed of principal lines and of principal diagonal lines — that is, of lines respectively parallel, perpendicular and inclined at 45°, to one or both planes of projection — may occupy any one of three positions. It may be (*a*) parallel to the plane of projection, in which case its projection is an octagon equal and parallel to itself; or (*b*) perpendicular to one plane and parallel to the other, its projection on the former being a horizontal line; or (*c*) perpendicular to both, in which case its projection on either is a vertical line. In other words, the plane of such an octagon may be either a coördinate plane or a profile plane.

a. Octagon parallel to plane of projection. In this position the shadow of the octagon is an octagon equal and parallel to the octagon itself, side for side, and falling under Rule (II), requires no further discussion.

b. Octagon perpendicular to one and parallel to the other plane of projection. Its shadow upon the former is an irregular octagon inscribed in the shadow of the corresponding square (47, *b*), and is drawn as follows: Construct the shadow of the square whose projection coincides with that of the octagon (Figure 45); draw its vertical diagonal and the rays passing through the two inner projections of corners of the octagon ($c'f'_1c'_1$ and $b'g'_1b'_1$, Figure 45, A). Through the intersections of these two rays with the vertical diagonal, draw horizontal lines. The eight intersections of these latter, and of the two rays, with the shadow of the square, mark the eight ngles of the shadow of the octagon, which is thus completely determined. Of its eight sides, two are shadows of the sides of the octagon parallel to the plane of projection, and are, therefore, horizontal lines equal and parallel to those sides, or to 1, if we take

[1] In No. 698 of the *Architect*.

a side of the octagon as unity. Two are shadows of the two sides of the octagon perpendicular to the plane of projection, and are, therefore, inclined at 45° to $G\,L$, and equal to the diagonal of a side of the octagon, or to $\sqrt{2}$. The remaining four sides of the octagon, alternating with the above, are parallel in pairs to the diagonals of the circumscribed square; two of them, therefore, cast short vertical shadows equal to their own projections, or to $\sqrt{\frac{1}{2}}$ or $\frac{1}{2}\sqrt{2}$ ($g'_1\,h'_1$, $d'_1\,c'_1$, Figure 45, A, and $o_1\,n_1$, $i_1\,k_1$, *ibid B*), while the other two cast

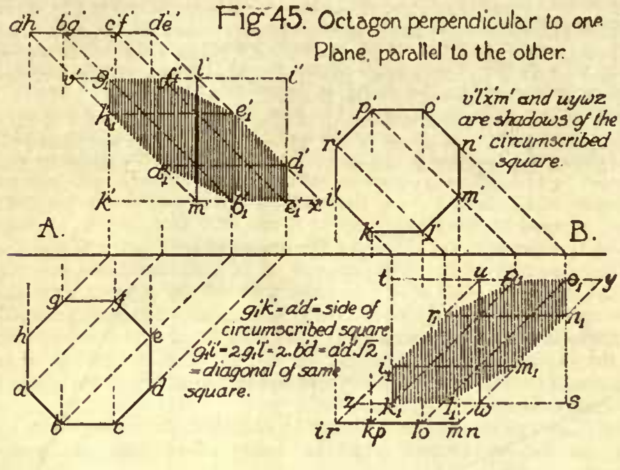


Fig 45. Octagon perpendicular to one Plane, parallel to the other.

oblique shadows inclined at 26° 34′ to $G\,L$ (49, and Figure 45, $f'_1\,e'_1$, $a'_1\,b'_1$ *in A*; $l_1\,m_1$, $p_1\,r_1$ *in B*). The length of these latter is $\sqrt{\frac{5}{2}}$, the unit being, as above stated, the length of a side of the octagon. The total height of the shadow is equal to the projection of the octagon, and its extreme width to the diagonal of that projection or of the circumscribed square. For in Figure 45 $g'_1\,l'$ is evidently half of $g'_1\,i'$. But $g'_1\,l'$ is also equal to $b'\,c' + c'\,d'$, that is, to a side of the octagon, *plus* the projection of an oblique side of the same. Hence (Note A at end of chapter) it is equal to half the diagonal of the square, and $g'_1\,i'$ which equals $2\,g'_1\,l'$, is equal to the diagonal of the square.[1] The extreme right and left hand angles of the shadow are right-angles.

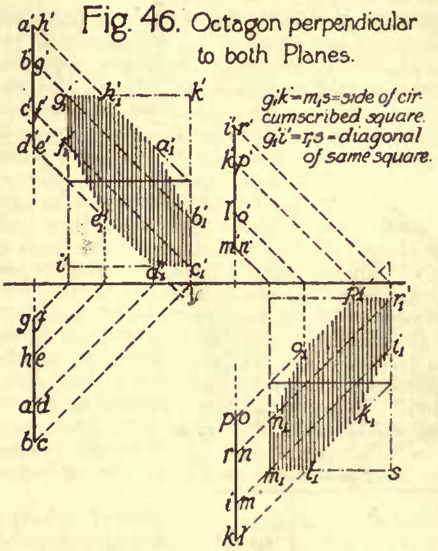


Fig. 46. Octagon perpendicular to both Planes.

c. Octagon perpendicular to both planes of projection. The octagon in a profile plane casts on either plane of projection a shadow precisely identical with the preceding, except in the direction of its sides with reference to $G\,L$ (Figure 46). Their direction with reference to the projection of the octagon is unchanged, but the latter is at right-angles with its position in *b*. The extreme width of the shadow of the octagon is now equal to the projection of the latter, and its height to the diagonal of that projection. The shadow may be inscribed in a rectangle of the same dimensions as in the preceding case, but set up on end.

54. The two cases *b* and *c* just discussed, may be included in one rule as follows: *a* falling of course under Rule (II) requires no further discussion.

(*VII*) *The octagon composed of principal lines and principal diagonal lines, and perpendicular to a plane of projection, casts upon that plane a shadow bounded by eight sides. Two of these are parallel to the projection of the octagon and equal to a side of the latter; two are perpendicular to its projection and equal to the projection of an oblique side of the octagon; two are inclined at 45° to G L and equal to the diagonal of a side of the octagon; and the remaining two are inclined at 26½° to its projection and equal to $\sqrt{\frac{5}{2}}$ of one of its sides.*

The area of the shadow of the octagon is equal to that of the octagon itself. The length and inclination of the shadows of the various diagonals of the octagon are not matters of special importance; their investigation would lead us too far afield, and the results would have little pertinence to our main object. They are consequently omitted from our discussion.

55. Since a circle inscribed in an octagon is tangent to the middle of each of its sides, the shadow of a circle cast on a plane must be a circle or ellipse tangent to the middle of each side of the shadow of the octagon. The shadow of the circumscribed octagon may therefore be used to obtain eight points of the required ellipse of the circle's shadow, and its direction at each of these points, and these data are quite sufficient to enable the draughtsman to draw the ellipse free-hand with very considerable accuracy (Note C at the end of this chapter). In the three positions corresponding to those of the square or octagon of the preceding paragraphs, the circle casts the shadows described below.

a. Circle parallel to a plane of projection. It casts a shadow on that plane equal and parallel to itself, and the shadow of its centre is the centre of its shadow. It is a case falling under Rule (II).

b. Circle perpendicular to one plane of projection and parallel to the other. In order to draw its shadow on the former, we observe that the projection of the circle is a horizontal line coinciding with that of the circumscribed octagon and square. Constructing the shadow of the octagon, and that of the square with its two diagonals (Figure 47 A, $e'\,g'$ and $j'\,p'$) the intersection of the latter with each other gives us the centre of the required ellipse, while their intersections with four sides of the shadow of the octagon give us the middle points of those sides, namely m', r', n', p', in the same figure. A horizontal line drawn through the centre of the ellipse, and another at 45° to $G\,L$ through the same point, intersect the four other sides of the octagonal shadow in their middle points, k', h', l', i', and we have thus the required eight points of tangency of the ellipse of shadow of the circle; that is, eight points of the curve and its direction at each of them. The ellipse can now be drawn free-hand through these points with an accuracy quite sufficient for ordinary purposes. Indeed, quite ordinary skill in drawing the ellipse enables one to construct the shadow of the circle with reasonable correctness by means of the four points of tangency furnished by the shadow of the square alone; and where extreme precision is not required, the greater simplicity of this method warrants its use in preference to the other (Figure 47 B).

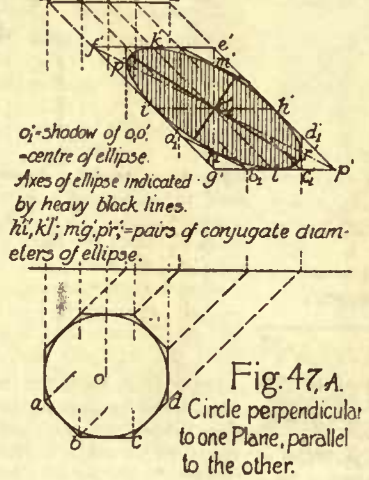


Fig. 47 A. Circle perpendicular to one Plane, parallel to the other.

56. The length of the axes of this ellipse of shadow, and their respective inclinations to $G\,L$, may be computed by the processes of analytical geometry,[2] or by the differential calculus. The latter is the method employed and demonstrated in Note B, at the end of this chapter. The results obtained by these calculations are given herewith, and should be carefully noted, as they furnish a simple and direct means of constructing these axes in place, and of the right dimensions and inclination, by the operations of plane geometry.

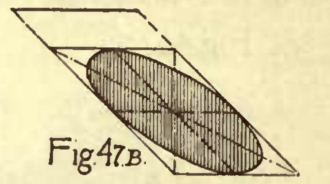


Fig 47 B. Shadow of circle drawn by means of circumscribed square, without the octagon, and from one projection alone of circle whose distance from plane of incidence is known or assumed.

Taking the diameter of the circle as unity, the length of the major axis of its shadow is found to be 1.61803, and its inclination to $G\,L$ (and consequently to the projection of the circle), 31° 43′ 3″, which we will call *angle* Θ. The inclination of the minor axis (which we may call Θ'), is of course the complement of this angle, and measures therefore, 58° 16′ 57″. The length of the minor axis is .61803, so that the difference between the two axes is 1. That is, *the diameter of the circle is equal to the difference between the lengths of the axes of its shadow.*

Let us now consider those two diameters of the circle, whose shadows form respectively the major and the minor axis of the ellipse; let us call the former of these diameters M, and the latter N; let a be the angle made by M with the plane of projection, and a' the angle made by N with the same plane. Now since the shadows of M and N are axes, and therefore conjugate diameters of the ellipse, M and N must be conjugate diameters of the circle[3]

[1] The shadow of the octagon is thus inscribed in the rectangle whose sides are equal to the side and diagonal of the circumscribed square, and two of the diagonally opposite angles of this rectangle coincide with the extreme angles of the shadow. The length of this rectangle may be determined by laying off to right and left of the vertical diagonal $l'\,m'$, a distance equal to $a'\,c'$ or $b'\,d'$, its height being that of the vertical diagonal itself.

[2] This has been admirably done by Mr. William Watson in his ingenious treatise on "Shades and Shadows" (Boston: Cupples, Upham & Co.), in Articles 28 and 30.

[3] Two diameters are said to be conjugate when each is parallel to the tangents at the extremities of the other; and since every tangent to a circle is perpendicular to the diameter terminating in the point of tangency, conjugate diameters of the circle are at right angles to one another. Now the *shadow* of each diameter must be parallel to the *shadow* of the tangent parallel to that diameter (that is, to the tangent to the curve of shadow); hence the shadows of conjugate diameters of the circle are conjugate diameters of the ellipse.

and therefore at right angles with one another. Investigation proves that *the angles a and a′ made by M and N with the plane of projection are the complements respectively of the angles* Θ *and* Θ′ *made with G L by the shadows of those diameters.* It further appears that *the tangents of a and a′ are respectively equal in length to half the axes which are the shadows of M and N;* that is, tangent $a = \frac{1}{2}$ major axis, and tangent $a' = \frac{1}{2}$ minor axis, of the ellipse of shadow.

57. The angle a' or Θ^1 is, as above stated, 31° 43′ (disregarding the seconds). This is precisely one-half the angle 63° 26′ made with *G L* by the long diagonal of the square in 46 *c*. The difference numerically in degrees between *a* and *a′*, as between Θ′ and Θ, is 26° 34′, which is the inclination of the long diagonal in 46 *b*. Thus the axes of the shadow of the circle, and the diagonals of the shadows of principal squares appear closely related. The diagonals of the shadow of the circumscribed square are unfortunately of little service in constructing the required axes of the ellipse by plane geometry. But this can be done as shown in Figure 48, by drawing the diagonal of the shadow of the *square at right angles* to the circumscribed square. If having constructed the shadow of the square circumscribing the circle *c e d f*, *a′ o′ b′*, and having found *i′* the middle of one long side, we erect the vertical *i′ k′ r′* till it meets in *r′* the ray passing through *b′*, we have half the shadow of a square perpendicular to the circumscribed square, and $r'\ o'_1$ is its diagonal, passing through o'_1 the centre of the ellipse; $r'\ o'_1\ i'$ is therefore an angle of 63° 26′; bisecting it, we have $n'\ o_1'$ making the angle 31° 43′ which gives the *direction* of the required major axis, to which the minor axis is of course perpendicular. But since $i'\ o'_1 =$ radius of the circle, $i'\ n' =$ tangent of $n'\ o_1'\ i' =$ tangent of 31° 43′, which equals half the minor axis, as already stated. Revolving n' down to p' we have $o'_1\ p'$ equal to the radius + $i'\ n'$ or to half the diameter of the circle + half the minor axis, that is, to half the major axis.[2] Therefore p' revolved up to c'_1 gives us $c'_1\ o'_1 =$ semi-major axis; $o'_1\ d'_1$ being made equal to this, completes the major axis, and the minor axis, normal to it, is easily laid off equal to twice $i'\ n'$.

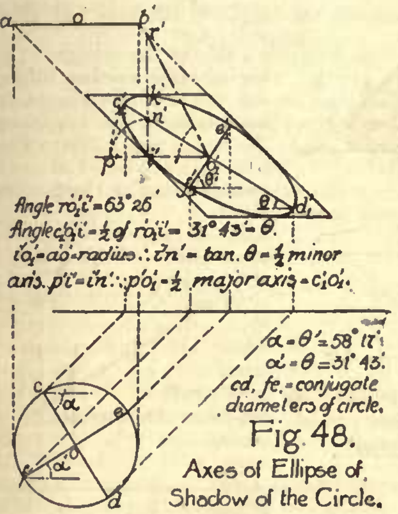


Fig. 48.
Axes of Ellipse of Shadow of the Circle.

The problem is thus solved, really in much less time than is occupied by this description of the solution. Figure 48 makes all this clear; in this figure *c d* is the diameter *M* and *f e* the diameter *N*.

58. While this is a convenient method for drawing the required axes with perfect accuracy, so that one is thereby enabled to construct the ellipse with precision from its axes by any one of several

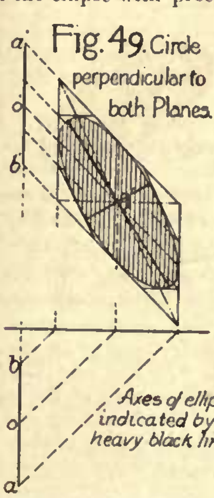


Fig. 49. Circle perpendicular to both Planes.

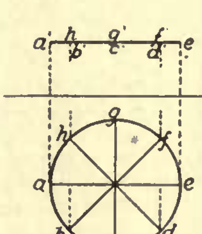


Fig. 50.
ae, cg.-principal diameters bf, hd.-oblique diameters bb′, dd′, ff′, hh′ -"corners" of the circle.

well-known processes, the circumscribed square or octagon will be found to furnish the most practical and convenient method for drawing the ellipse in ordinary cases. There is, however, another method which approximates sufficiently to correctness to be serviceable, while dispensing with the square and octagon. By substituting for the angles 58° 17′ and 31° 43′, the simpler angles of 60° and 30°, we are enabled to lay off the direction of the required axes with the 30° × 60° triangle, while the resulting error is hardly perceptible. And by making $\frac{5}{4}$ and $\frac{3}{4}$ of the diameter of the circle do duty respectively for 1.618 and .618, we can measure off the required length of either axis with the dividers, with great ease. From the axes thus obtained a sufficiently true ellipse can be drawn free-hand by any draughtsman of tolerable skill, or more accurately constructed by the familiar geometric methods.

It is evident that the ellipse of shadow of the circle is comprised within the same limits of extreme length and height, as the shadow of the corresponding octagon. It can, therefore, be inscribed in the rectangle whose sides are equal to the diameter of the circle and its diagonal, or to the side and diagonal of the circumscribed square, the points of tangency being very near two diagonally opposite corners of the rectangle.

59. *c. Circle perpendicular to both planes of projection.* The circle in a profile plane casts upon either plane of projection a shadow precisely like the one just described, except in the angle of its inclination to *G L*. As in the case of the octagon, the relation of its various parts to the projection of the figure casting the shadow is unchanged; but that projection being now perpendicular instead of parallel to *G L*, the angles made with the latter are the complements of those in *b*. In this case, therefore, *a* and *a′* become respectively equal, instead of complementary, to Θ and Θ′. If, however, we make Θ and Θ′ represent in both cases the angles of inclination of the axes *to the projection of the circle*, instead of to *G L*, the statements with regard to *a*, *a′*, Θ, and Θ′ in *b* become true of the present case also. The major axis of the ellipse in the case under consideration makes an angle of 58° 16′ 57″ with *G L*, but its inclination to the projection of the circle remains as before, 31° 43′ 3″; the inclination of the minor axis to *G L* is 31° 43′ 3″; but to the projection of the circle its inclination is 58° 16′ 57″, as in *b*.

60. The two cases, *b* and *c*, may be included, therefore, under one rule, as follows (round numbers being substituted for precise figures):

(*VIII*) *The shadow of a circle perpendicular to a plane of projection is an ellipse inscribed in the shadow of the circumscribed octagon, and tangent to the middle of each side of that shadow. Its major axis is inclined to the projection of the circle at an angle of* 30° *very nearly, its length being in round numbers* $\frac{5}{4}$*, and that of the minor axis* $\frac{3}{4}$ *of the diameter of the circle. The centre of the ellipse is the shadow of the centre of the circle, and the areas of the circle and of its shadow are equal.*

61. The four diameters of the circle which are respectively parallel and perpendicular to the plane of projection, and inclined to it at 45° in either direction, deserve a moment's attention. Their shadows pass through the centre of the ellipse (55, *b*), and terminate in the eight points where the ellipse is tangent to the shadow of the octagon. The extremities of the two "diagonal" diameters of the circle (that is, of diameters at 45° to the plane of projection) have been called by a happy inspiration of Prof. W. R. Ware's the "corners" of the circle (Figure 50). They are important points, marking the two points of tangency of rays of light, the point of greatest illumination, and the central point of shade on the circumference of the circle. In the case of a right cylinder perpendicular or parallel to one or both planes of projection, the two points of tangency of rays of light mark the ends of the straight lines of shade on the surface of the cylinder, these lines being said to be on the "corners" of the cylinder (Figure 53).

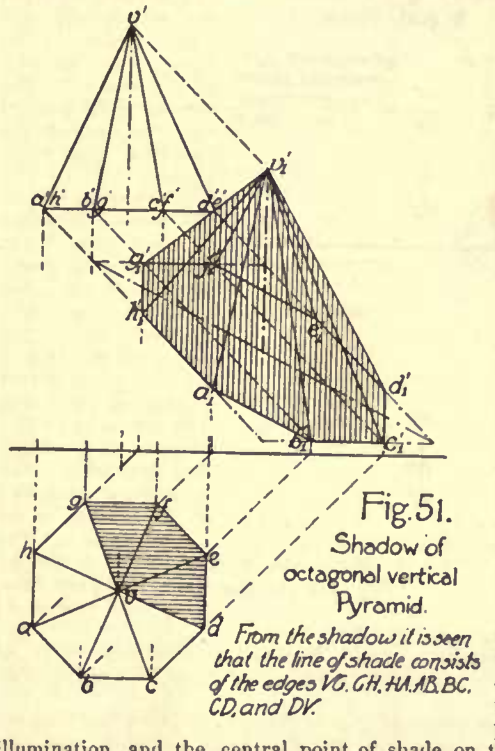


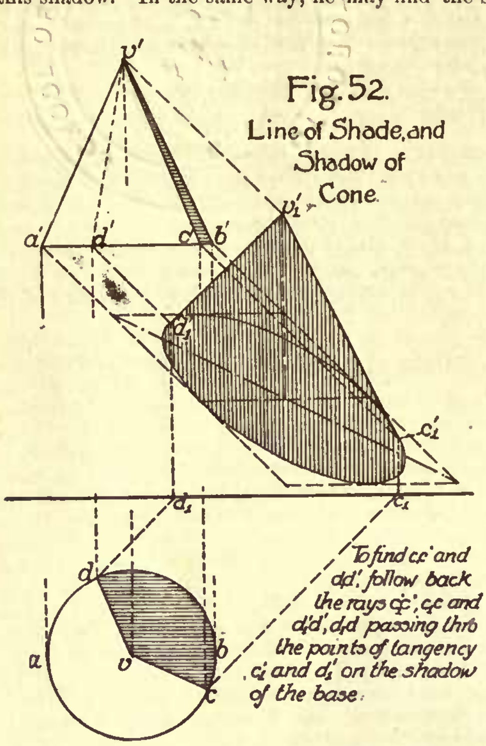
Fig. 51.
Shadow of octagonal vertical Pyramid.
From the shadow it is seen that the line of shade consists of the edges VG, GH, HA, AB, BC, CD, and DV.

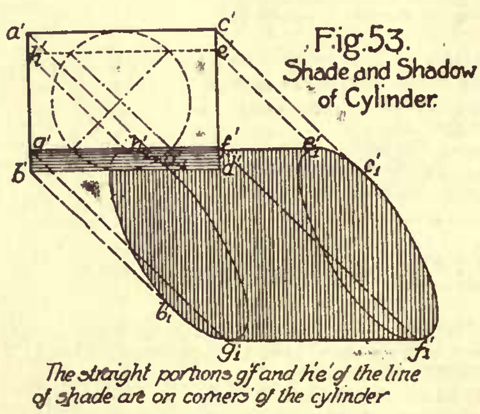
62. Having mastered the cases of lines at 0°, 45° and 90° to one or both planes of projection, which cast their shadows on coördinate planes, together with the plane figures composed of such lines, it becomes possible to draw the shadow of any solid composed of these lines and figures when cast upon a plane of projection or coördinate plane. The chief difference between plane and solid figures relates to the line of shade, which, in the case of plane figures, is nothing else than the outline of the figure itself, and presents no difficulty whatever. But every solid has its own definite line of shade, whose shadow is the outline of shadow of the solid, but whose actual form and horizontal and vertical projections are often not evident at a

[1] In the preceding discussion of these angles no account has been taken of + and — signs of tangents and angles, nor of their *algebraic* value. The angles have consequently not been read always in the same direction, the *acute* angle being taken in each case for measurement. This is less rigidly scientific, perhaps, but more practical than the other course, because architectural draughtsmen prefer to construct and to specify obtuse angles by means of their complements.

[2] Because the minor axis + diameter of the circle = major axis, as stated in 56.

glance. In order, therefore, to draw correctly the shadow of such a solid, it would appear necessary to first ascertain its line of shade. In many cases, however, this necessity is only apparent; for if, disregarding the line of shade, we cast the shadows of all the faces and edges of the solid, the shadows of those edges which are not lines of shade will fall within the limits of the whole shadow, whose extreme outline will be the shadow of the line of shade. In Plate II,[1] No. 3, for example, the shadows of all twelve edges of the vertical tile are cast. The shadows of six of these edges which form an irregular hexagonal outline, while those of the other six fall wholly within this outline. The former six, therefore, form the line of shade; namely, *d'e'*, *e'f*, *f'b'*, *b'g'*, *g'h'* and *h'd'*. The same thing is seen in No. 4. Thus it is possible to work backwards, and to ascertain the line of shade of a solid by means of the shadows of all its parts. But this is an exceptional procedure; it requires the casting of a number of shadows, which, in the end, prove wholly superfluous, and is less direct and less scientific than to cast the shadow from the line of shade. In some cases, however, it is so difficult, if not impossible, to ascertain directly the projections of the latter, that the procedure above suggested becomes at once the easiest and most direct solution of the problem, as in the case of the cone; and there are other occasions in which the draughtsman finds it to his advantage to operate backwards in the above manner. The shadow of the octagonal tile (No. 7 in Plate II) is obtained in this way, and the student will find no difficulty in finding its line of shade from this shadow. In the same way, he may find the shadows on coördinate planes and the lines of shade of a variety of rectangular and octagonal parallelopipeds and prisms. By casting the shadow of the base of a pyramid and connecting its extreme points with the shadow of its apex, the shadow of that solid may be drawn and its line of shade ascertained (Figure 51). In the same way, two lines drawn from the shadow of the apex of a cone tangent to the elliptical shadow of its base complete the shadow of the cone itself. By tracing the rays from the two points of tangency back to the projections of the base of the cone itself we obtain the projections of one end of each of the straight portions of its line of shade, which can then be drawn from these points to the apex of the cone, this being the *only* way to find the line of shade on a cone (Figure 52).[2] The same process may be applied to the cylinder, whose shadow is cast by drawing the shadows of both of its bases and connecting them by two parallel tangents, which are, of course, the shadows of the rectilinear parts of its line of shade. The latter can be found, as on the cone, by following back to the cylinder the rays passing through the points of tangency of the shadow; and they prove to be, as stated in 60, on the "corners" of the cylinder in the case of all such as have axes parallel or normal to the plane of projection (Figure 53). But this is only an alternative method in the case of the cylinder and of most geometrical solids, whose lines of shade, as well as the forms of their shadows, can be brought under general rules or specific statements. This will be done in the next chapter for the cube and parallelopiped, the octagonal prism, the square and octagonal pyramid, the cylinder and the cone. The student will in the meanwhile find it both profitable and interesting to cast the shadows of these solids by the method just indicated, and to find the form and nature of their lines of shade in those positions in which they most frequently occur in architectural practice. He will, as a result, find himself on familiar ground when the discussions of the next chapter are reached. Even the sphere may be treated in this manner by casting the shadows of its three "principal" great circles (59, VIII) and drawing the circumscribed ellipse tangent to the three shadows.

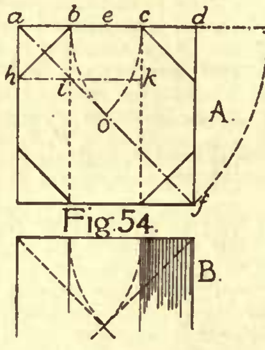


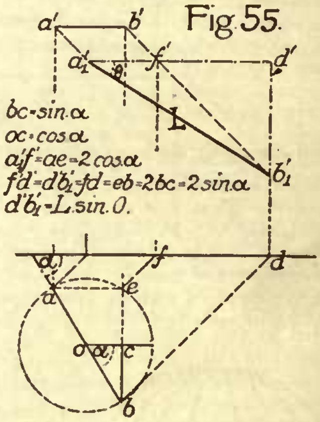


[1] See No. 698, issue of May 11.

[2] What appear to be other methods are in reality variations or abridgements of this one.

Note A. The regular octagon may be drawn either (*a*) by means of the inscribed circle, to which with the T-square and 45° triangle the eight sides are drawn tangent: or (*b*) by revolving down upon the sides of a square its half-diagonals as in Figure 5, A. This latter method is specially convenient when only the rectilinear projection of the octagon is desired, as it locates at once the two interior angles (Figure 5, B). Two points thus obtained suffice, indeed, for drawing the whole octagon, since parallels to the adjacent sides of the square drawn through these points, locate on the opposite side the ends of the other two oblique sides of the octagon. The length of any side of the octagon is the diagonal of the projection of an oblique side: hence if that length be taken as unity, the length of the projection $a\,b$ of an oblique side $h\,b$ is $\frac{1}{2}\sqrt{2}$ or $\frac{1}{\sqrt{2}}$. The difference between the length of the side and diagonal of the circumscribed square equals a side of the octagon; thus (Figure 5, A) $ag - ad = bc$ or 1. This suggests another method of drawing the octagon, which may be left to the reader's ingenuity to work out. In order to demonstrate these statements, it is required to prove that the half-diagonal $ao = bc + ab$, and that af (or ag) $- ad = bc$, that is, that $dg = bc$. Now $ao = ai + io$. But $ai = hb = bc$. And $io = ab$, since their diagonals ik and hb both $= bc$.





Hence $a\,o$, since it equals $ai + io$, must equal $bc + ab$, q. e. d. Furthermore, $ac - ae = ec$. Multiplying by 2, and remembering that $2\,ac = 2\,ao = af = ag$; that $2\,ae = ad$, and that $2\,ec = bc$, we have $ag - ad = bc$, q. e. d.

Note B. *Axes of the ellipse of shadow of the circle.* Plane geometry furnishes a method for mechanically delineating the axes of any ellipse of which two conjugate diameters are given. This applies to the ellipse inscribed in the shadow of the octagon, since any two alternate diameters of the four passing through the eight points of tangency, are conjugate diameters. But this method is not simple or direct enough to be of practical service to the draughtsman, and is, therefore, omitted from our discussion. In order to deduce a general statement of the relations between the diameters of the circle and the axes of its shadow, and to demonstrate these relations the processes of analytical geometry may be employed, as has been done by Mr. W. Watson in his "*Shades and Shadows*," referred to in the note to 56. Another treatment of the subject is herewith presented, based on the principle of maxima and minima as developed in the differential calculus, and readers of a mathematical turn-of-mind may be interested to follow out the operations and reasoning involved:

Taking for illustration the horizontal circle casting its shadow on $V'P$ (Figure 55) the line L is seen to be the shadow of a diameter $a\,b$, $a'\,b'$, of a circle; a is the angle which this diameter (which we will call M) makes with $V'P$, and Θ the angle made by L with $a'\,b'$ or $G\,L$. Now $L^2 = (a'_1\,d')^2 + (d'\,b'_1)^2 = (M.\cos.\,a + M.\sin.\,a)^2 + (M.\sin.\,a)^2 = M.^2\cos.^2 a + 2\,M.^2\cos.\,a.\sin.\,a + M^2\sin^2 a \times M^2\sin.^2 a = M^2(\cos.^2 a + 2\cos.\,a.\sin.\,a + 2\sin.^2 a)$; and since $\cos^2 + \sin^2 = 1$, and $M = 2$ (being twice the radius which is the unit in Trigonometry) $L^2 = 4\,(1 + \cos.^2 a + 2\cos.\,a.\sin.\,a + \sin.^2 a)$ whence

$$L = 2\sqrt{1 + 2\cos.\,a\sin.\,a + 2\sin.\,a} \qquad . \qquad . \qquad (1)$$

Now the major axis of the ellipse is the longest shadow that can be cast by a diameter of the circle; hence the value of a which makes L a maximum will be the angle of inclination to $V'P$ of the

diameter whose shadow is the major axis of the ellipse. Differentiating, we have

$$\frac{dL}{d\,a} = 2\cos^2 a - 2\sin^2 a + 2\sin a\cos a \quad . \quad . \quad (2)$$

and since for the maximum value, $\frac{dL}{d\,a} = O$, we obtain by dividing by 2 $\cos.^2 a$, and transposing

$$\frac{\sin.^2 a}{\cos.^2 a} - \frac{\sin.\ a}{\cos.\ a} = 1;\ \text{that is, } \tan.^2 a - \tan.\ a = 1\ . \quad (3)$$

Completing the square and extracting the roots of the equation, $\tan.^2 a - \tan.\ a + \frac{1}{4} = 1\frac{1}{4}$, and $\tan.\ a - \frac{1}{2} = \pm\frac{\sqrt{5}}{2}$, whence

$$\tan.\ a = .5 \pm \sqrt{\tfrac{5}{2}} = 1.61803 \text{ or } -61803\ . \quad . \quad (4)$$

That is, in order that M may cast its longest shadow, which is the major axis of the ellipse, it must make with VP the angle whose tangent is 1.61803, namely, 58° 16′ 57″; and the conjugate diameter which casts the shortest shadow, must have the inclination whose tangent is —.61803, or — 31° 43′ 3″, since this makes L a minimum. This latter angle proves to be, as it should be, the complement of .

To find the values of L, substituting in (1) the values of sin. a and cos. a corresponding to 58° 16′ 57″, we have $L = 2$ (1.61803); while for the angle — 31° 43′ 3″, we obtain the minimum value 2 (.61803) values exactly equal to twice the *tangents of these two angles.* The value of Θ is obtained from the proportion sin. Θ : $b'_1 d'$: : radius : L, whence $\frac{\sin.\ \Theta}{2\sin.\ a} = \frac{1}{L}$ Therefore $\sin.\ \Theta = \frac{2\sin.\ a}{L}$, and substituting in this equation the ascertained values of sin. a and L, we find that Θ = the angle whose sine is .525813 = 31° 43′ 3″. The minor axis at right angles to this must, therefore, be inclined at 58° 16′ 57″ to the vertical projection of the circle or to $G\,L$. *Hence the angle of inclination of either axis of the ellipse is the complement of the inclination to the plane of projection of the diameter whose shadow is that axis.*

The same result is reached by noting that $\cos.\ \Theta = \frac{a'_1\,a'}{L} = \frac{2(\cos.\ a + \sin.\ a)}{L}$ and $\tan.\ \Theta = \frac{\sin.\ \Theta}{\cos.\ \Theta} = \frac{2\sin.\ a}{L} \div \frac{2(\cos.\ a + \sin.\ a)}{L} = \frac{\sin.\ a}{\cos.\ a + \sin.\ a}$. Hence

$$\frac{1}{\tan.\ \Theta} = \cot.\ \Theta = \frac{\cos.\ a + \sin.\ a}{\sin a} = \cot.\ a + 1. \quad . \quad (5)$$

But from (3) we have (dividing by tan. a), $\tan.\ a - 1 = \frac{1}{\tan\ a}$, or in other words, tan. a = cot. a + 1, which (5) shows to be equal to cot. Θ. That is, *a and* Θ *are complementary angles*, since cot. Θ = tan. a. Q. E. D.

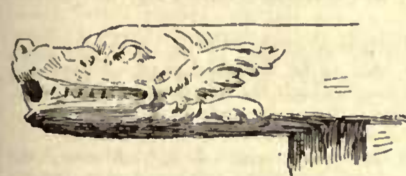
NOTE C. *The ellipse.* The subtle beauty and peculiar character of this curve every draughtsman should thoroughly understand, and be able to reproduce with ease and accuracy for any given axes. Its constant occurrence in the projection and perspective of arches and circles, and its own intrinsic grace of movement, demand this; but there



are few architectural forms more often incorrectly and unsympathetically drawn. Its beauty and subtilty lie in its gradual but regularly increasing change of curvature. The circle is an easier curve to understand, but harder to draw well, because the least error is evident to the eye and spoils its beauty, while slight variations from accuracy in the ellipse are not so noticeable or offensive. It is a good plan to execute, free-hand, some of the geometrical methods for constructing the ellipse on given axes, and then to sketch the same ellipses offhand, observing carefully the rate of curvature, especially near the vertices. The change of rate should never be sudden nor specially marked at any one point. Practice in drawing ellipses of very varied proportions, making them always so perfect as to *appear like the perspectives of circles*, is never wasted, since the training it gives to hand, eye, and the artistic perceptions, is of the most excellent sort.

[To be continued.]

ROMAN RUINS IN ALGERIA.



Waterspout from Dantzic

BATNA, whose Arabic equivalent means *bivouac*, or *we have spent the night*, lies about half-way between Sétif and Biskra, in Algeria, and made a good stopping-place between these two points on our journey to the Sahara Desert. It is only five hours' ride from Sétif by the railway of the Compagnie Est Algérienne. It is well worth while to stay over at Batna and visit the extensive Roman remains at Lambessa and Timegad, the latter the most interesting ruins in Algeria. Lambessa was the ancient town of Lambœsis, founded in 169, A. D., which soon grew to be an important city, with a population of 60,000 souls. There are remaining two fine gates of the four by which the city formerly was entered. The north gate led to the main road between Constantine and Sétif, on which are to be found many remains of tombs and monuments to the dead, which the Romans so frequently erected on their highways.

The Prætorium is a splendid massive ruin, the columns and façade to the south presenting an imposing appearance. What blocks of solidity, what monuments for all time, are these grand arches, standing firmly and steadily in the same spot where they have held their place for over fifteen hundred years! This rectangular structure is ninety-two feet long and sixty-six feet broad, its height measuring forty-nine feet. The keystone over one of its gates bears the inscription, "Legio tertia Augusta." The interior is now used as a museum, and is filled with antiquities which have been unearthed in the immediate vicinity. There are ruins of the Roman baths, where we found some fine mosaics. Further to the east we found the Arch of Commodus, which is in a very good state of preservation, and just across the road, not far away, are the ruins of the Amphitheatre, of which very little remains, but sufficient to trace its circular shape without difficulty. This edifice is thought to have had the capacity of holding 12,000 spectators. It was destroyed but recently; they say persons are still living who have seen it almost in a state of wholeness.

We visited the Palace of the Legate and the Forum, and strolled through the remains of the Arch of Septimius Severus. Close to the Forum was the Temple of Æsculapius, of which there is very little left standing. But this, like the Amphitheatre, was also quite complete within the memory of the oldest inhabitant. We made a search for some of these persons to have this story corroborated, but, failing to find them, had to trust to the truthfulness of our *valet-de-place* and the guide-book.

Indeed, many of these fine old ruins have been destroyed by the Arabs or the unappreciative French colonists, their substantial stones being used for building some little hut or primitive dwelling of the settlers. There stands now in the French village an old Roman gate, which forms one side of a stone house.

The tomb of T. Flavius Maximus, commander of the Third Legion, has been restored lately by the French, and when his sarcophagus was replaced in its ancient resting-place after the renovation of the latter it was reinterred with military honors. But if Lambœsis proves so attractive to the archæologist, he will find much more to interest and to repay him if he visit the ruins at Timegad, the ancient Thamugas. This was a Roman town of much importance, situated, as it was, at the junction of six highways. We have not space here to enter into its history at length, but a full description of its ruins will be found in that well-known and charming book, the "*Footsteps of Bruce*," whose author came here in 1875. Ptolemy makes mention of this town as Thamutuda, and it has also been written of as Tamagada, Colonia Marciana Trajana Thamugas, and Colonia Ulpia Thamugas. There are inscriptions near the Forum which celebrate victories of Trajan over the Parthians, with a reference to the thirtieth Legion Ulpia.

This town had a position of great military importance. It has also been the seat of many religious wars and agitations. Here the great bishop, Optatus, became the leader of the Donatists in the year 400 A. D., and is spoken of by St. Augustine as one who ruled Africa. At Thamugas lived some other celebrated bishops: Novatus and Sextus in the third century, and Faustinus and Secundus in the fifth century. Between 300 and 400 A. D. the city was ruined, and restored again in the sixth century; the fortress shows marks of this restoration.

There are the ruins of a Christian church which was in existence under Gregory, in 646 A. D., when the Arab invasion took place. On the lintel of the door was inscribed:

In temporibus Constantini Imperatoris
Fl. Gregorio Patricio Johannes dux
de Tigisi offeret domum Dei + Armenus.

This Christian church is the only ruin to be found of any interest on the west bank of the ravine, but on the east we found the remains of a Byzantine fortress, a theatre, forum, temple and triumphal arch, the latter much finer than the one at Lambessa; indeed, it is considered one of the most imposing ruins in Algeria. It has three arches, the centre one nearly twelve feet, and the side openings over eight feet in height. It is of the Corinthian style, and its four fluted columns, eighteen and one-half feet high, are in an excellent state of preservation. The original stones bearing the inscription have fallen from their place. This arch is built of sandstone, with columns, capitals, bases of the pilasters, brackets and entablature of white marble.

The remains of the Temple to Jupiter Capitolinus, although quite in ruins, show that once it must have been a magnificent structure. The forum is not yet fully unearthed, as there has been very little excavated since 1883, when the French Government placed these ruins under the supervision of M. Duthoit, architect-in-chief of historical monuments in Algeria, and he, with a corps of engineers, opened this mine of historical interest, and published plans and accounts of these two Roman towns.

As Algeria becomes better known and more frequented by the travelling world, I feel sure that this spot will prove one of its principal attractions. It is most convenient to take it in a journey from Algiers to Tunis, as it is only two hours from the main line between the two cities, and a day's carriage-drive from Batna enables the

traveller to stop at both places for hasty visits. The historical student and archæologist would, of course, prefer to make a longer stay. Possibly, when there is a greater influx of visitors, the hotel accommodations at Batna may be improved. At present, let him who comes here do so simply for the love of the historical, for all idea of comfort or luxury must be abandoned. The best hotel in the town is neither clean nor comfortable, but one can manage to endure it for the sake of the wealth of Roman ruins which lie so near. — *B. in the New York Evening Post.*

NOTES AND CLIPPINGS

Manganese Bronze. — The escape of the "*Calliope*" from Apia Harbor when all the other men-of-war were either sunk or beached has been attributed by some experts in England to the fact that her propeller was made of manganese bronze. The subject is referred to not merely for the sake of demonstrating the advantage which it is thought the "*Calliope*" derived from the character of her propeller, but also to show that a screw of this description really offers a substantial gain in the matter of speed. The "*Calliope*" made her way against the storm at the rate of one-half knot per hour, which represented the difference between what her engines were capable of doing when forced to their maximum and the power of the storm, and it very rarely happens that an extra half-knot is all that there is between safety and destruction. Yet this half-knot is not to be despised at any time, fair weather or foul, particularly should the voyage be a long one. The extra speed is acceptable, and the saving in coal, should it not be required, is by no means inconsiderable. The steel screw blades of several steamers plying between England and the west coast of South America were exchanged for others of manganese bronze, and, although the gain in one instance was only a quarter of a knot per hour, the effect was seen in the saving of between eight and nine tons per day in the coal account. In two ships running to Australia, in which a change of propellers was made from steel to manganese bronze of exactly the same surface and pitch, the speed was increased almost a knot an hour. Eight ships of the White Star Line have propellers of manganese bronze, as well as the "*City of New York*" and the "*City of Paris*" and two of the Cunarders. Other large companies have adopted the same material, and have been rewarded by increased speed and coal economy. Outside the circle of the mercantile marine there are numerous instances in the British Navy where a saving in the weight of the propeller of twenty to twenty-five per cent is claimed. The French have also adopted the same metal for some of their fastest vessels, notably the "*Forbin*" of nineteen and three-fourths knots, one of the fastest cruisers in the world. These examples have likewise been followed by Russia in some of her fast vessels. A peculiar kind of manganese bronze is used for this purpose which possesses great strength and toughness, said to be about equal to that of the best cast-steel, and as compared with gun metal, of which propellers used to be quite generally made, it possesses twice the strength, so that a great reduction can be made in the thickness of the blades, which therefore become finer and sharper. There is also a peculiar smoothness of surface, which results in a lessened skin friction, a very important consideration where high rates of speed are to be maintained, and the competition for first place among the ocean greyhounds is as keen and active as at present. Manganese-bronze castings are claimed to be smoother and less liable to warp than cast-steel. Freedom from pitting and corrosion preserves the blades for a long time in their original form, so that the life of the propeller will be fully equal to that of the vessel. This metal is considerably more expensive than steel, and, weight for weight, it is about a quarter more expensive than gun-metal, but the saving in weight over the latter and the fact of the pitting which steel is subjected to from the action of salt water make a very strong argument in favor of manganese bronze. When engines are developing into such magnificent and perfect specimens of mechanical art it would seem wise to supplement their powers with the most efficient and enduring propeller that can be found suited to the purpose. — *New York Times.*

The Eiffel Tower. — Much has been said about the origin of the modern Tower of Babel on the Champ de Mars, and the idea of its construction has been claimed for several persons. It will go down to posterity, however, as Eiffel's Tower, just as America was called after Amerigo Vespucci instead of Columbus. It is well-known that M. Eiffel — eminent engineer though he be — is no more originator of the tower than the Man in the Moon, but he took up the idea, had it elaborated, used his influence to popularize it, and finally superintended the colossal work until the idea and the plan became the wonderful reality which people of all nations are flocking to see. Here, in brief, is the history of the tower, which is nearly 1,000 feet high. In November, 1880, M. Sébillot, a French electrical engineer, conceived the idea of lighting Paris by electricity from one focus placed on a tower 300 metres high, the structure to stand in the Louvre court-yard or in the Place du Carrousel. In his report M. Sébillot pointed out that such a tower would be double the height of the Pyramid of Cheops or of the spire of Strasbourg Cathedral, but that modern facilities for dealing with steel and iron would render the construction possible. M. Sébillot took M. Bourdais — architect of the Trocadéro — into his confidence, and they both worked at the plan of the proposed tower, which was laid before the Society of Civil Engineers and then relegated to pigeon-holes. In 1883, however, another civil engineer — M. Nouguier — studied the project *minus* the electric-lighting propositions, and mooted it to M. Alexandre Eiffel, who had distinguished himself by the Douro Bridge and the Garabit Viaduct. M. Eiffel did not take kindly to the project at first, but on second thoughts he commissioned MM. Nouguier, Koechlin and Sauvestre to draw up a definite plan, which he adopted and carried out with energy and determination, despite immense opposition and even ill-will. M. Eiffel, therefore, is neither the projector nor the builder of the tower, any more than M. de Lesseps was the cutter of the Suez Canal, but he fostered the idea, fought for it with tooth and nail in pamphlets, lectures and newspaper articles, and never gave in, until to-day the tower, originally thought out in the brains of M. Sébillot and M. Nouguier, stands on the Champ de Mars as a marvel of modern science. — *London Daily Telegraph Paris Correspondence.*

How Large was Ancient Rome? — After carefully examining all the data we have, all the statements of the various ancient writers who allude to it, and all the facts which seem to bear on the question, I am convinced that in estimating the number at 4,000,000 I am rather understating than overstating it. It is much more probable that it was larger than that it was smaller. De Quincey also estimates the inhabitants of Rome at 4,000,000. I will only cite one fact, and then leave this question. The Circus Maximus was constructed to hold 250,000, or, according to Victor, at a later period probably, 385,000 spectators. Taking the smaller number, then, it would be 1 in 16 of all the inhabitants if there were 4,000,000. But as one-half the population was composed of slaves, who must be struck out of the spectators, when the circus was built there would be accommodation then for 1 in 8 of the total population, excluding slaves. Reducing again the number one-half by striking out the women, there would be room for 1 in 4. Again, striking out the young children and the old men and the sick and impotent, you would have accommodation for nearly the whole population. Is it possible to believe that the Romans constructed a circus to hold the entire population of Rome capable of going to it? — for such must have been the case were there only 4,000,000 of inhabitants. But suppose there were only 1,000,000 inhabitants, it is plain from the mere figures that it would never have been possible to half fill the circus. — *Blackwood's Magazine.*

Our Fir Stronger than Oak. — Some very interesting tests of woods native to Washington and others native to other timber sections of the country was made yesterday afternoon at the Northern Pacific car shops. The purpose was to demonstrate the relative strength of the woods.

There were present at the tests, master-mechanics Warner and Phipps, of the shops, engineers Lund and Haines and architect C. B. Talbot.

The timber tested was subjected to an actual breaking, on sticks 2 x 4 inches and four feet long, to centres, being one-fourth as long, thick and wide as an actual stringer as used by the railroad company in its trestle bridges. The test is important as there seems to have been but little information on that subject, and the impression has been that ordinary oak was stronger than fir. The tests show, however, that yellow fir is actually one-third stronger than eastern oak, and more than one-half stronger than eastern white pine. The breaking weight, placed squarely in the middle of each stick, was as follows:

No. 1. Old piece of yellow fir from yard; having decayed ends, six years in the weather; 3063 pounds.

No. 2. New soft piece fine grain yellow fir, similar to the best flooring timber, 3062 pounds.

No. 3. Old piece yellow fir, coarse grain and hard, broke short at 4320 pounds.

No. 4. New piece from the butt of tree, coarse grain, broke with a stringy fracture at 3635 pounds.

No. 5. New piece Michigan white pine, soft and clear, broke short at a weight of 1610 pounds.

No. 6. New piece of Michigan oak broke nearly short off at a weight of 2428 pounds.

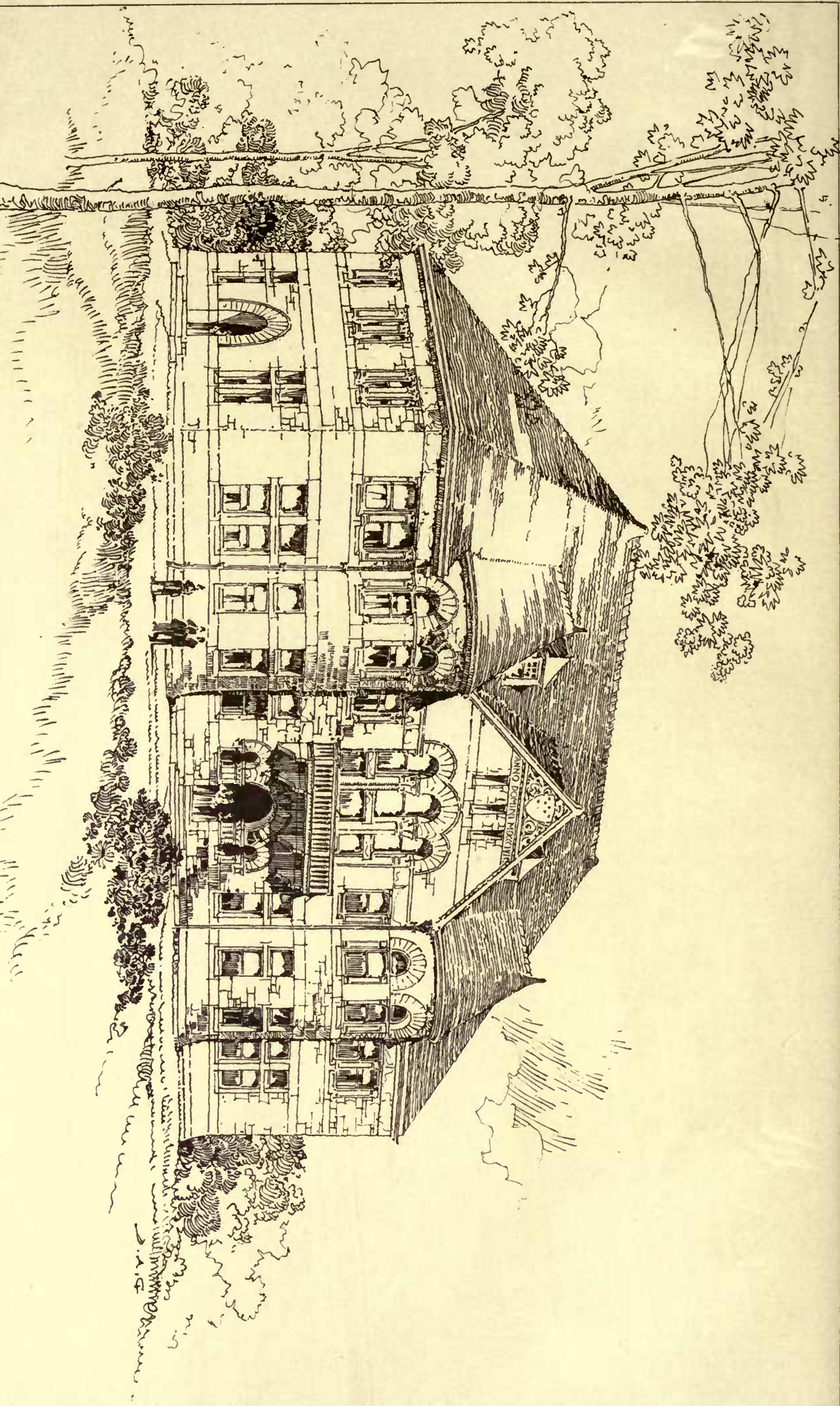
All of the pieces of wood were subjected to the same clear span of 3 feet 9 inches, and the weight applied exactly in the middle.

As to the deflections, the following notes were made: Nos. 1 and 2, half an inch; No. 3, three-eighths of an inch; No. 4, five-eighths of an inch; No. 5, one-fourth of an inch; No. 6, one and one-eighth of an inch. — *Tacoma Daily Ledger.*

Corner-stone Records. — The fashion of placing objects like coins, inscribed bricks and so forth under or in the corner-stone of an important building is very ancient. M. de Sarzec found four such hiding places in the foundations of a palace built by a very ancient King of Chaldea called Gudea, whose headless statue is now in the Louvre. There were sacred cones and statuettes of clay, seals, and other amulets from protection against bogeys, and tablets or cylinders of clay inscribed. The fashion is found later in Babylonia and Assyria, Nabonidus, the last King of Babylonia, while restoring the temple of the sun at Larsa, found the original foundation cylinder, according to his own statement, on one which he placed in the cavity. He boasts that Kurigalzu (about B. C. 1350) and Esarhaddon (B. C. 680–667), had sought for it in vain. Unfortunately this most ancient cylinder has not been found. Perhaps he kept it for his own library. In his late excavations at Naucratis, Egypt, the English explorer Petrie, found under the four corners of a building erected during the Greek Ptolemy reigns miniature models of all the tools used in the work and small specimens of all the materials, from a tiny brick to a slip of gold and bit of lapis lazuli. These objects are now in the British Museum. — *Exchange.*

English Artists and Knighthood. — Sir Joseph Boehm, the sculptor, who is a German by birth, has three predecessors in history who received like honors from the British Crown. Sir Godfrey Kneller, who was also not of English birth; Sir Everett Millais, and Sir Frederick Leighton preceded him. Chantrey was knighted in 1835, Westmacott in 1837, and John Steel in 1876. Of architects there have been Chambers, Wyattville, Soane, Smirke, Barry, and Scott who were authorized to write Sir before their names. — *Exchange.*

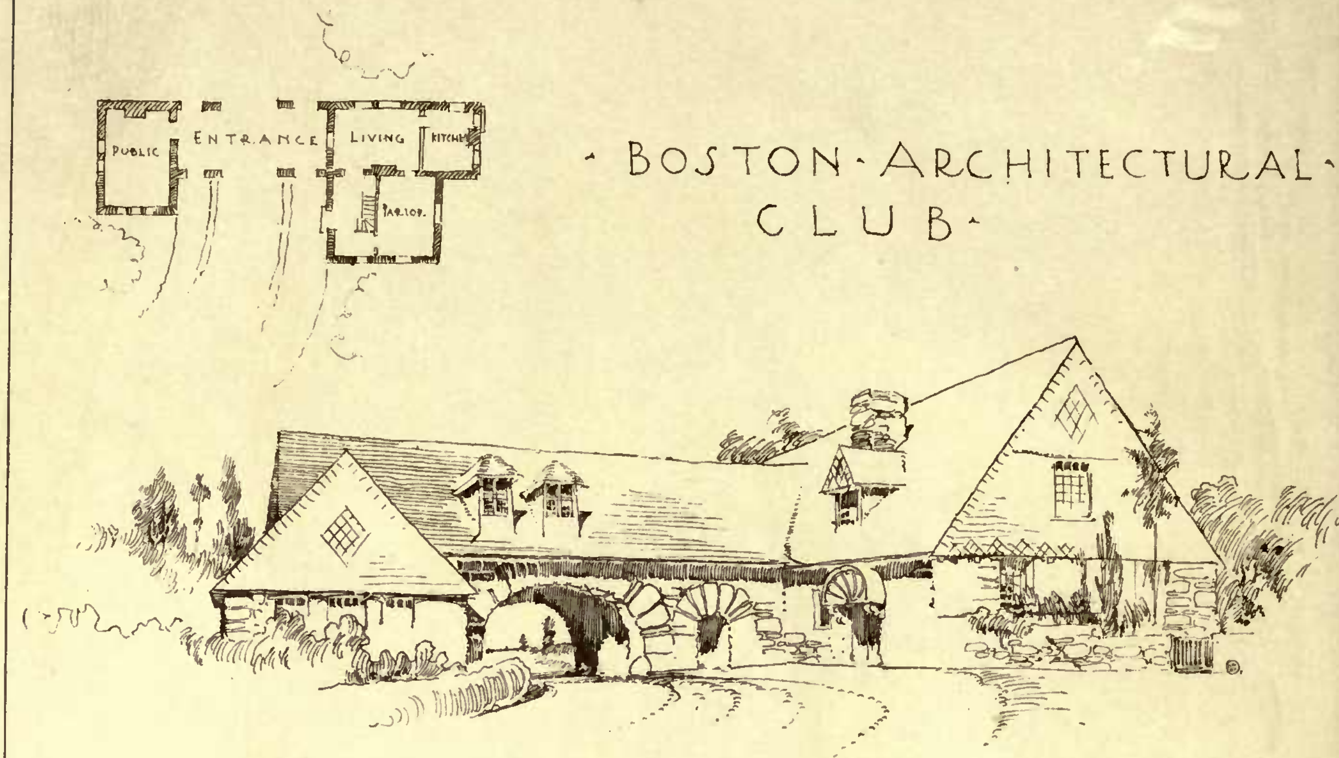
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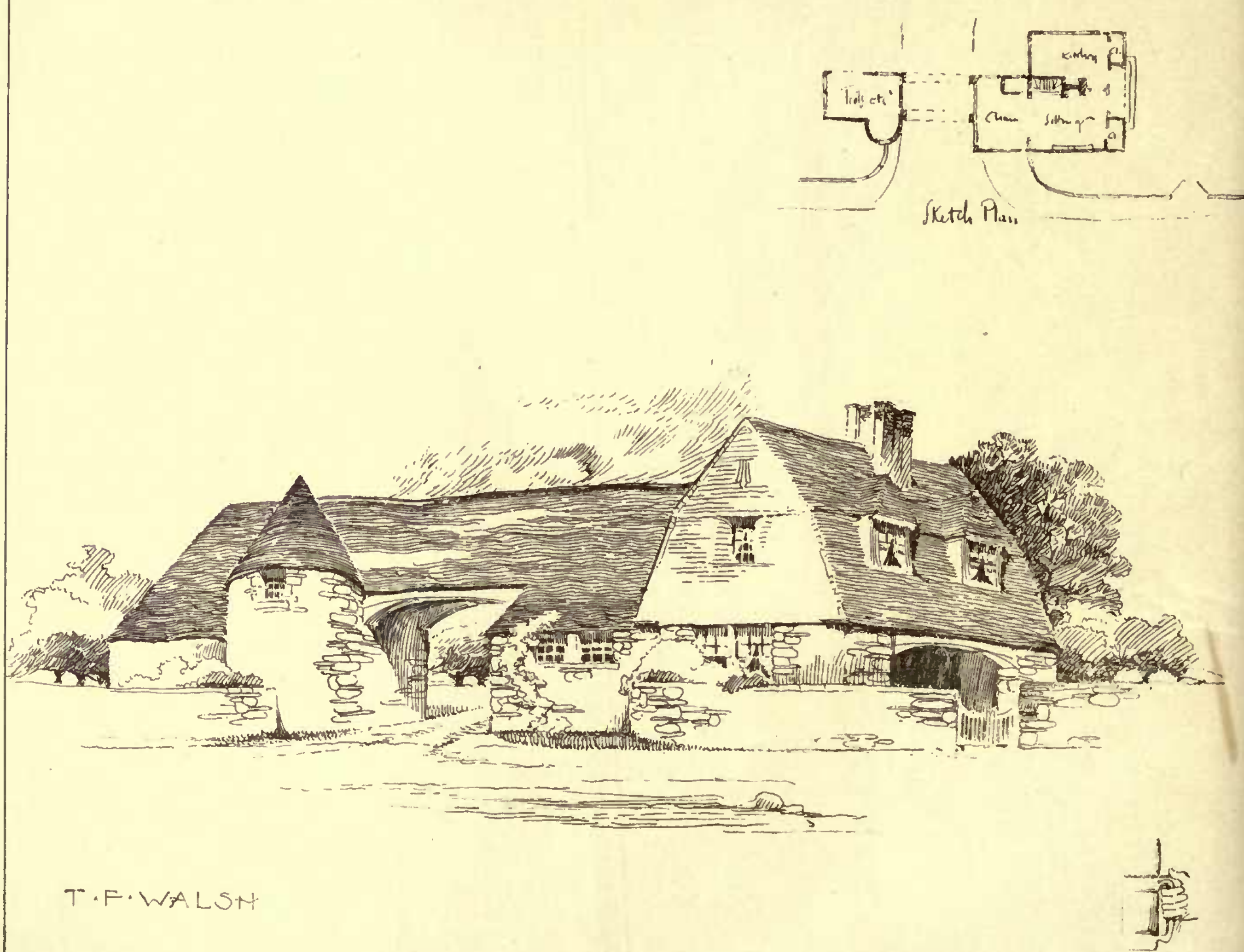
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T·F·WALSH

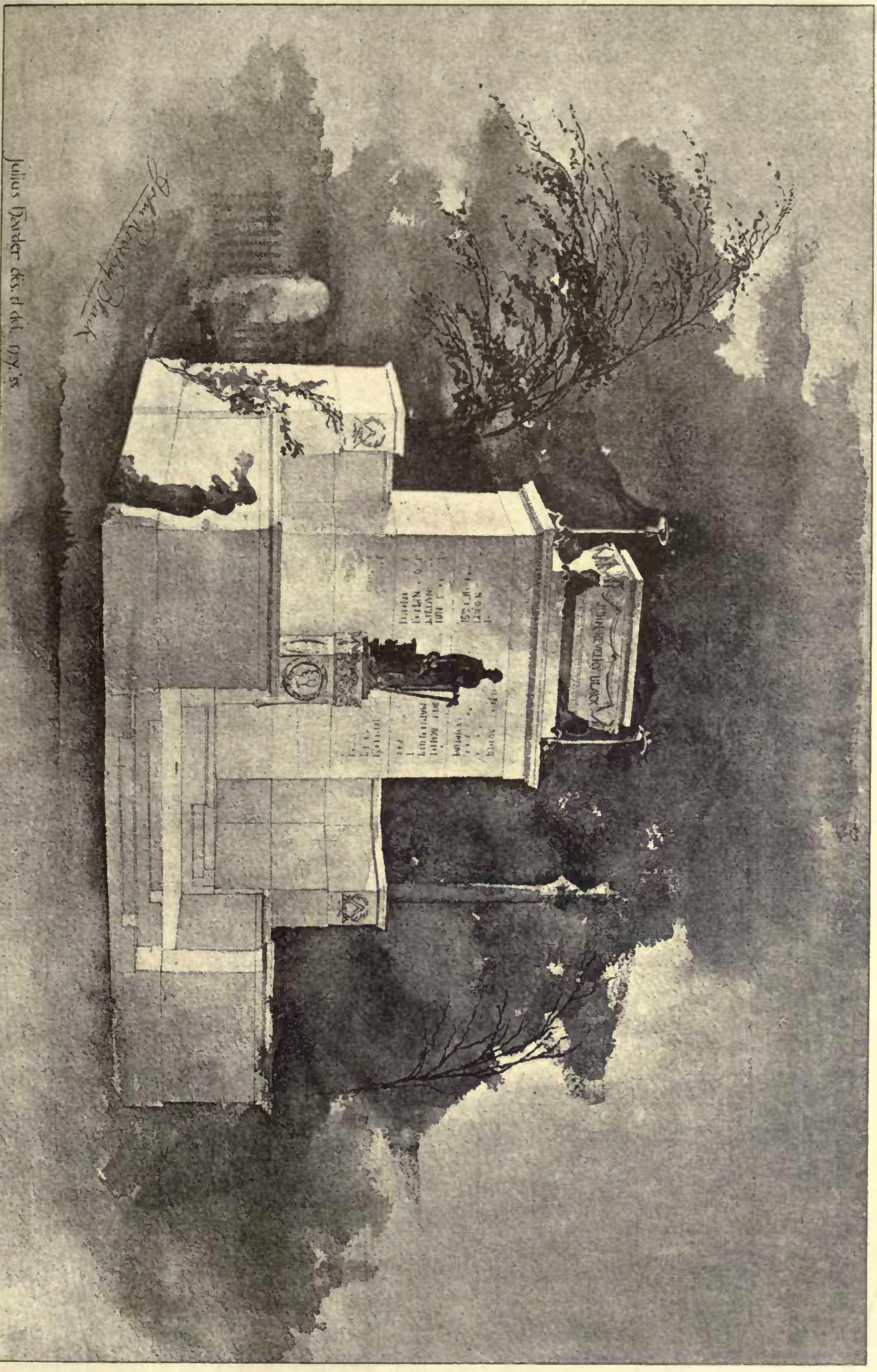
COMPETITIVE DESIGN FOR

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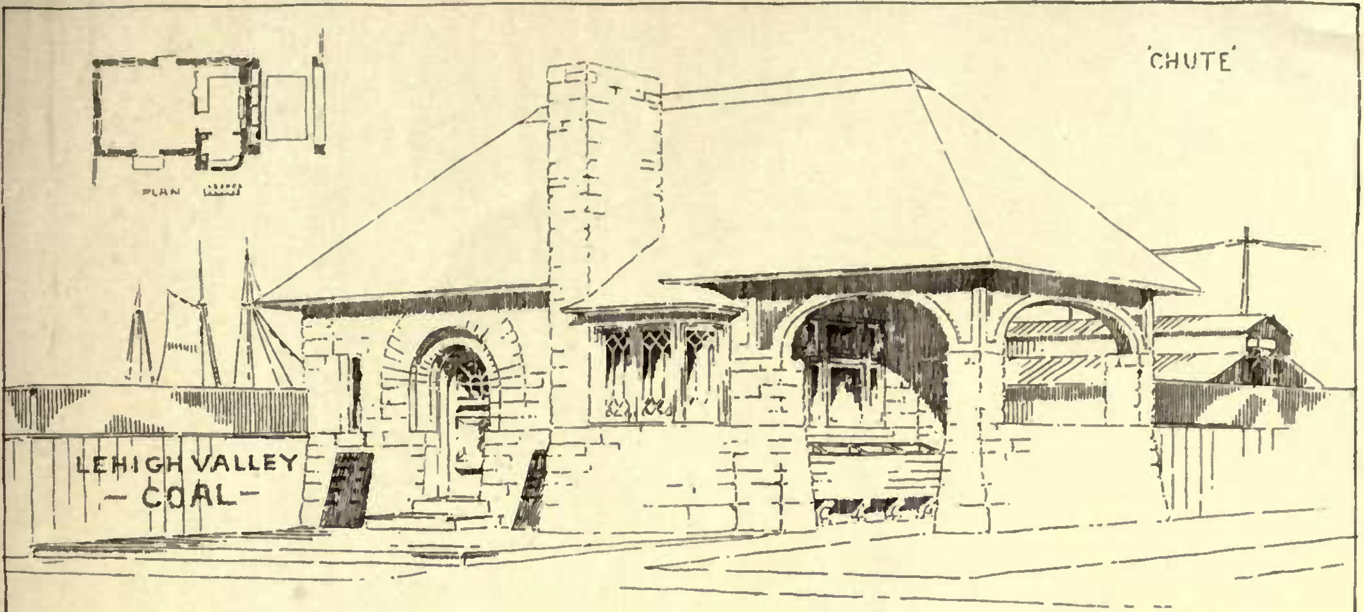


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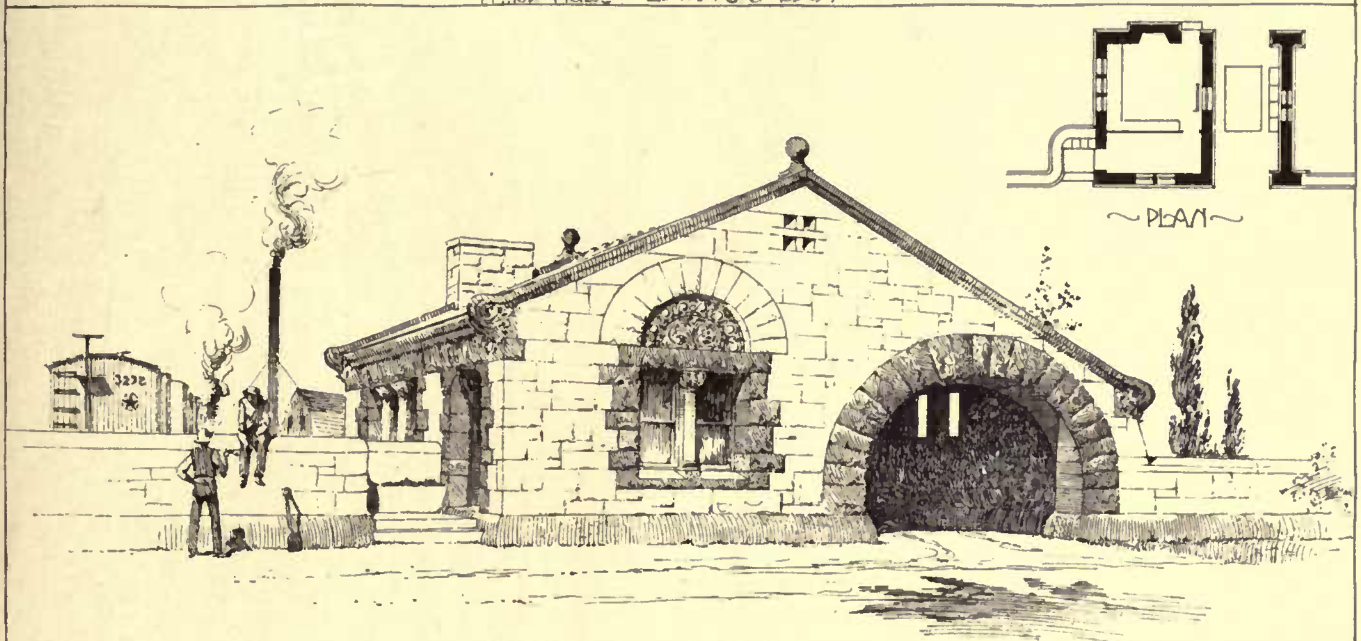


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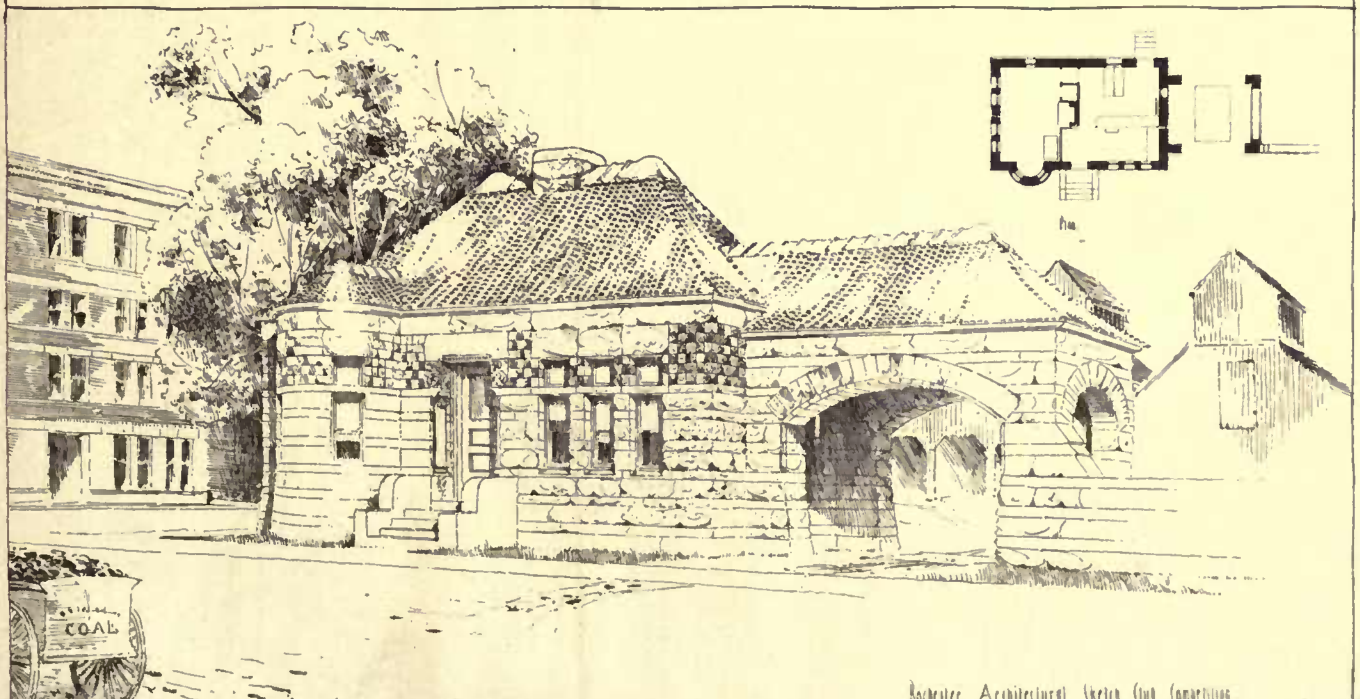


RASC-COMPETITION FOR A COAL OFFICE

THIRD PRIZE — EDWIN S GORDON



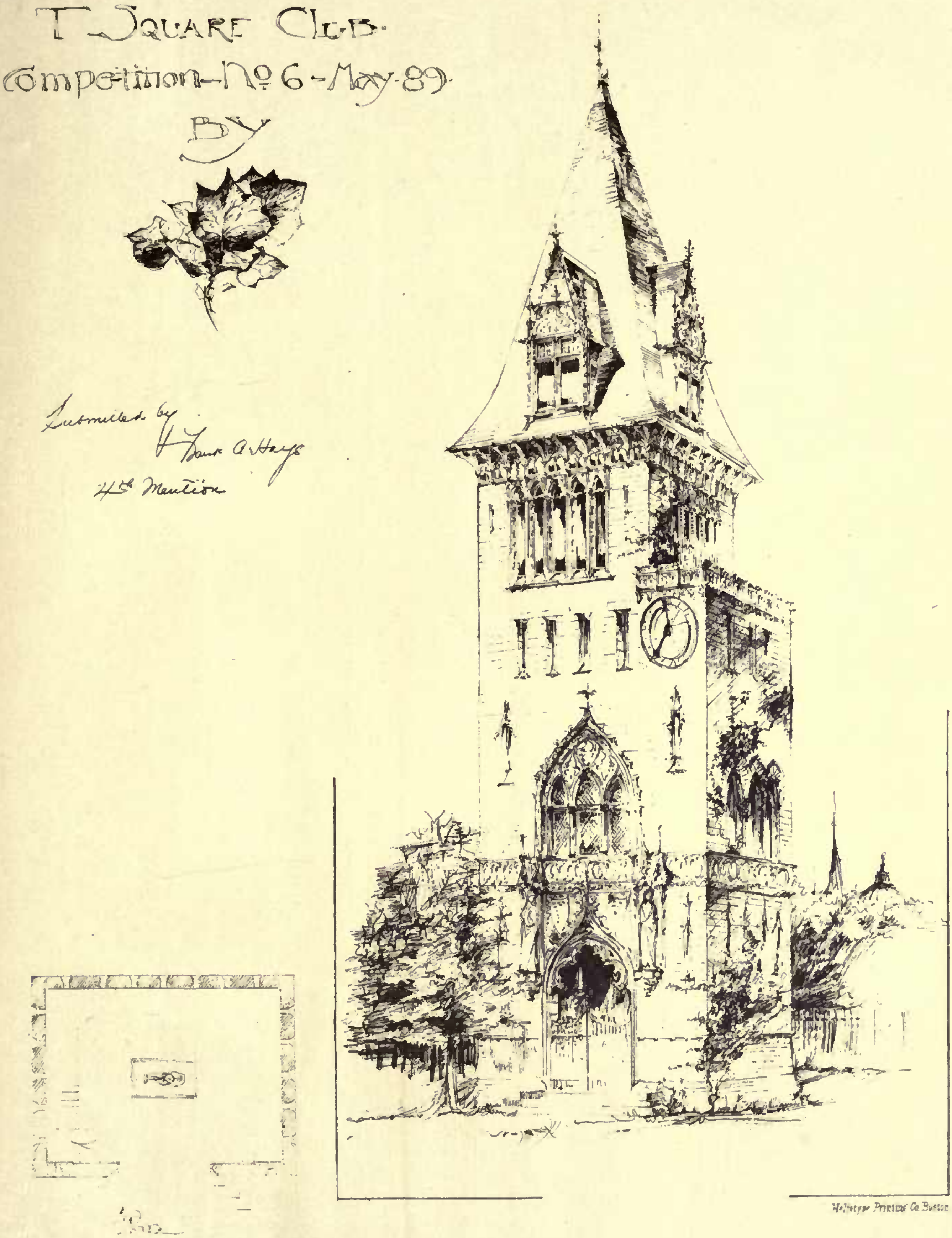
SECOND PRIZE ~ CLAUDE F BRAGDON



FIRST · PRIZE ~ WM · H · ORCHARD

Rochester Architectural Sketch Club Competition
Stone Coal Office: By 'Graphic'.

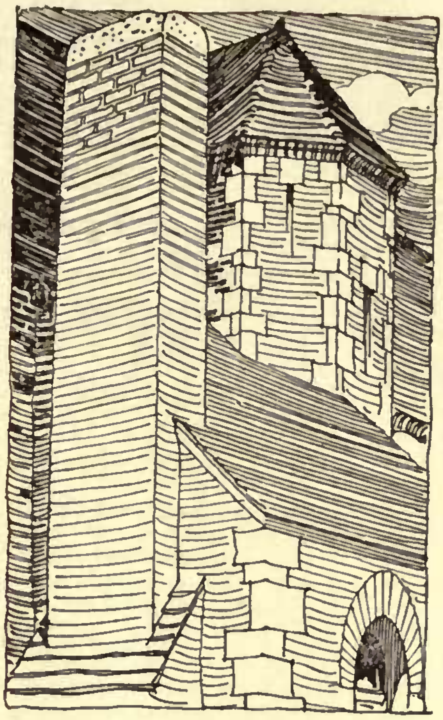
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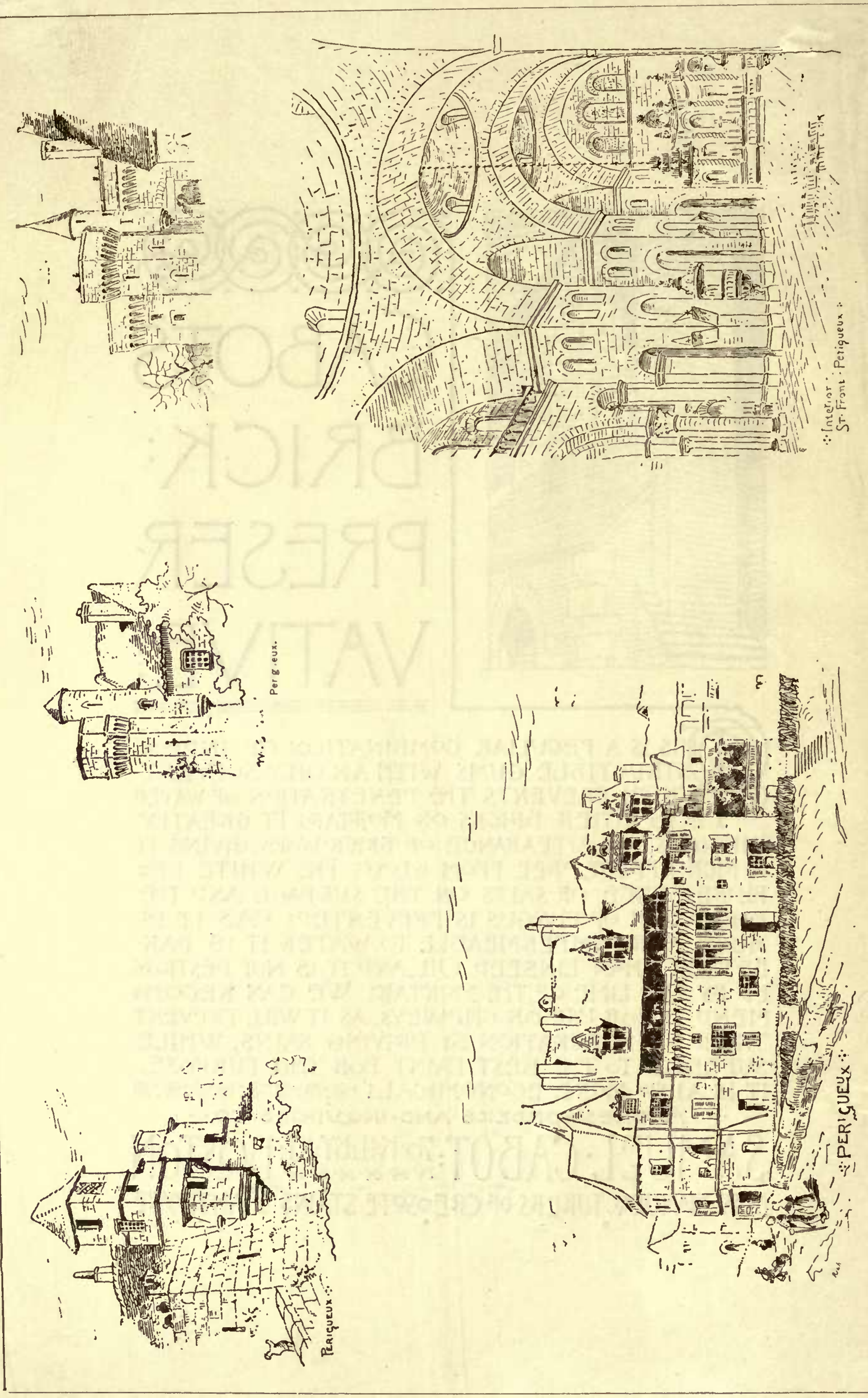


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THE Convention for reorganizing the American Institute of Architects is to take place in a few months, in the City of Cincinnati, and it has been suggested that the two great organizations which are to consolidate may receive new members until that time, who will, by the act of consolidation, become members of the new body. While there may be no practical objection to this, we doubt very much whether it is the best policy for either organization to attempt to carry with it any considerable number of members acquired between the passage of the vote of consolidation and the Convention for carrying the vote into effect. As matters now stand, each of the two great societies knows the names of all the members of the other, and the members of each society are willing to meet all the members of the other as friends and brothers, but we are by no means sure that it would conduce to the harmony of the Convention to have either society find in the assembly-hall on the opening day a large number of new brethren, belonging to the other organization, whom it never heard of before, and did not bargain for in its approval of the reorganization scheme, and who, it might fear, would be utilized to push through measures which would not be approved by the members of the two bodies who have already thoroughly considered and discussed the plan of consolidation. It will unquestionably be just as easy for good architects to enter the new Institute as the old, and in our opinion they would show the best taste by waiting until their new home is open to receive them, and then walking in through the front door, instead of making arrangements to be transferred quietly with the baggage, however earnestly they may be invited to avail themselves of the latter method.

WE never like to appear to meddle in other people's business, or to offer advice beforehand in regard to matters which will be settled at the proper time by the persons whom they principally concern, but in view of the great importance to the profession of the work of the new American Institute of Architects, which is to come into existence in two or three months, and the advantage of as long and free discussion as possible of the questions which will come before it, we feel it rather incumbent upon us to break our rule for once, and to offer with due modesty such suggestions as occur to us, with the hope that some of them may be found useful. In the first place, as the question of selecting a permanent location for the administration of the Institute will probably be among the earliest to be settled, we wish to add something to what we have previously said in favor of the selection of Washington for the purpose. A strong effort will undoubtedly be made to keep the Institute offices in New York, which has so long been the seat of the parent Institute, and where are collected the valuable Institute library, the archives, and the men who have so long and so ably directed the affairs of the elder body; and as the action of the joint committee, in assigning Cincinnati as the place of meeting of the Reorganization Convention, shows that in their opinion, which probably reflects that of the profession in general, no one city, outside of New York, has any preëminent claim to professional favor, the effort is very likely to succeed through the neglect to unite the opposition upon any other location. Now, although we fully appreciate the inconveniences of moving the offices of the consolidated societies away from New York and Chicago, and of selecting new officers who can attend to necessary business outside of those cities, the advantages to be gained by transferring the administration to Washington seem to us to outweigh very greatly the temporary inconveniences. Among these advantages, one of the greatest is the guaranty which the transfer affords of the permanence of the new organization. It is obviously impracticable to make the Institute a peripatetic body; it must have a permanent location, and to fix this location in New York or Chicago would, judging from past experience, inevitably lead in time to the disruption of the new organization into at least two local and independent societies. It is not that New York is situated very far from the geographical centre of the country, for it is at least as convenient a place to go to as any, but, professionally considered, it is a province by itself, inhabited by a strong and active body of men, who extend their activity all over the Union, not always to the advantage of the local practitioners in other communities. We do not for a moment suggest that our architects resent the intrusion of those from other places into their domain; in fact, we know that the attitude of the profession is in this country one of the utmost courtesy toward architects from any quarter; but the fact remains that the architects of Boston, Cincinnati, Indianapolis, St. Louis and Kansas City think of New York as a place so full of enterprising and brilliant members of the profession that the voice of a modest Westerner or Downeaster has not much chance of being attended to. With Washington the case is very different. Not only is the local professional interest very small there, and likely to remain so, but Washington is above all others the Federal city, in which every State has an equal share, and is represented by a delegation of well-known men, bound to claim respect and recognition for their fellow-citizens. In the choice of such a place for permanent administration no offence could be given to any one, and the mutual confidence and harmony which are so essential to the usefulness of the new Institute need not fear disturbance by any local feeling whatever.

IN addition to this, Washington is nearly as convenient a place to go to as New York, and is considerably more central, as well as more interesting, to such trustees or members of committees as may have to make occasional visits to it. The main advantage, however, next to its federal character, of adopting it for the permanent home of the Institute is to bring the principal professional body into closer relation with the principal building-owner in the country, the United States Government. Both for the architects and the public, this is one of the most urgent necessities with which the new Institute will have to deal. As every one knows who has had anything to do with the Government, the public business is managed by human beings who find their private affairs much more interesting than those of the public, and generally get over the latter with as little expenditure of time and trouble as possible. Of all the affairs with which they deal, they probably know least, and care least, about the design and construction of the Government buildings, and the average congressman undoubtedly regards the Government plan-factory, which saves him all trouble of thinking on such matters, as a most commendable device. The permanent presence of the American Institute of Architects in the city, and still more, the holding of the conventions there, would open the eyes of many a senator and representative for the first time to the fact that there were people in the world who made a profession of beautiful building. Discovering that these persons formed a body of considerable importance, the next step for a legislator who wished to introduce a novelty into the appropriation-bill would be to call in, on his way to the Capitol, at the office of the Institute for suggestions, and he would certainly gain some new ideas by doing so. After a considerable number of members of Congress had

done the same, a notion would begin to dawn upon them of the advantages of a great and noble public architecture, which miles of petitions and memorials would fail to produce, and the way would be opened for a most desirable change in the system of Government building. The history of Congressional legislation shows nothing more plainly than that personal contact and pleasant acquaintance counts with our legislators for far more than logic or abstruse principles; and there is no place where an active representative body, visibly occupied in the promotion of the art of architecture, and, let us hope, in the defence of the interests of those who profess that art, would attract more attention than in Washington.

OF all the professional visitors who drop in upon us as strangers and leave us as something less, we have never been more drawn to any than to one who visited us a fortnight ago — a young Englishman who had come on from New York to see what was the nature of the graduating festivities at Cambridge. If ever ocular observation joined to a few moments chat discovered a refined and high-bred nature, such discovery we made in the case of Hubert Westell, and as he left the room we had a distinct feeling that nature had been unusually kind in endowing him with such evident physical and mental vigor while, if his eye was a truthful witness, parents and preceptors had done their work in moulding his moral nature. The strong impression which we felt at the time some might say was a psychological effect and that had we possessed a fully developed nature we might have been able to give a warning that would have prevented one of the most distressing boating casualties of the season. On the Fourth of July, Mr. Westell, in company with another young Englishman, Mr. Wills, was capsized by a squall while boating on the North River. After clinging to the boat for a while they decided to swim for the shore but, alas, only one of them was able to endure the strain. So much distressed with his own efforts was Mr. Wills that he did not know when or where his companion was overcome and so escaped being a helpless witness of a painful scene. Mr. Westell was born in Whitney, Oxon, England, about twenty-four years ago and was, we believe, a graduate from the neighboring university, though as he had been in this country about three years and previous to that had been a student, a favorite one, in the office of Mr. J. M. Brydon in London, perhaps this may not be so. But the fact that he was an Associate of the Royal Institute of British Architects and a winner of the Pugin Travelling-Scholarship is evidence enough of his professional training. A few months ago Mr. Westell formed a partnership with two other gentlemen who like himself had been for some years in the office of Mr. G. B. Post, of New York, and the composition of the firm led one to expect from it work of very unusual excellence. It so chances that it is this week "the turn" for the publication of two designs contributed by the new firm, and as they do not bear the well-known ear-marks of the junior member of the firm, we infer that Mr. Westell himself made not only the drawings but also the designs, which thus give evidence to his ability to treat with refined simplicity a problem that leads so many designers into the paths of mere eccentricity.

MOST persons know something about the Balmain luminous paint, which at one time seemed likely to come into extensive use for brightening the interior of tunnels and other dark places. Although Mr. Balmain probably improved the manufacture of his paint, which is said to have been made of oyster-shells calcined with sulphur, he was by no means the inventor of the luminous compound, which is described at length, with the process of manufacturing it, in an old book which was familiar to our boyhood, and seems, from a curious story which is told about it, to have been known to the Orientals for many centuries. A Chinese legend says that a certain emperor, who reigned about a thousand years B. C., was told one day of a picture, belonging to one of his subjects, which had a remarkable property. The picture represented an ox, and every morning the ox came out of his frame, and went to graze in the meadows, returning at night, to resume his place in the frame, where he remained quietly until the next morning. The emperor caused the picture to be brought to him, and sought in vain for an explanation of the mystery. After the mandarins of the court had exercised their philosophy over it to no purpose, an old priest was found, who remembered that the Japanese had the art of treating oyster-shells in a certain way, and mixing them with various pigments so as to form colors which were invisible by day, but became visible at night. The picture, he suggested, was probably painted with these colors, and as the figure became invisible by daylight, it needed no great credulity — for a Chinaman — to imagine that the animal had temporarily joined the flocks feeding in the neighboring pastures.

A SYNDICATE of five men is said to have secured a monopoly of the spruce for the New York market by buying about half a million acres of land in the Adirondack Mountains, on which is practically all the spruce timber left standing in the State, some seven hundred million feet, according to the estimates. The price paid for the land and timber is said to have been something more than a dollar an acre, and the spruce alone will be worth several times the amount of the purchase-money, while a great deal of hard wood will still remain to be cut and sold. Every one does not know how enormously profitable the cutting of lumber is under the present tariff. The duty on imported spruce is, if we are not mistaken, two dollars a thousand feet, so that the pecuniary value of the advantage which the owners of this tract will enjoy over the Canadian lumbermen, who would probably be their only competitors, amounts to fourteen hundred thousand dollars, or nearly three dollars an acre on their land, which cost them about one and a quarter. Of course, there are advantages to other people besides the lumbermen in the protection which they enjoy, and the tariff has probably done more to open up the forest regions of our Northern States than any other agency, so that we only call attention to the fact of the prosperity of the business, without going into questions of political economy, which are far outside of our province.

LE GENIE CIVIL, in its official capacity as the technical organ of the Paris Exposition, gives many interesting details of the progress of the great show, which seems likely to be the most successful affair of the kind yet undertaken. In the average daily number of visitors, the exhibition of 1889 has so far greatly exceeded that of any previous one. At London, in 1851, the average for several weeks was only about thirty thousand, but it gradually increased to about fifty-six thousand, which was the highest point. In this respect, the next exhibition, that of Paris in 1855, was considerably less successful than that of London, but the Paris exhibition of 1867 somewhat surpassed that of London. The next one, that at Vienna in 1873, had more visitors than the London one, but less than the last one at Paris; and our own, at Philadelphia, was the most successful of any that had been held up to that time. The present show at Paris, however, attracts, so far, many more visitors than even that at Philadelphia, the average of paying visitors during the first week, exclusive of Sunday, having been about seventy thousand, while fourteen thousand more, holding season-tickets or free passes, passed through the gates daily. On the first Sunday, however, the number of persons passing the turnstiles was two hundred and seventeen thousand, two hundred and sixteen, which brings the average for the week up to ninety-one thousand per day. It seems likely that these averages will be much exceeded later, as the railways will soon begin running excursion trains at low fares. Although everything is not yet completely in order, there are plenty of curious things to be seen. Among these, the Edison exhibit, as the daily papers have already informed us, attracts, perhaps, the largest crowds. The special mark of the exhibit, which distinguishes it from afar, is a gigantic pyramid of incandescent lamps, containing ten or twelve thousand, which rises up to a height of sixteen or seventeen feet, and must present a brilliant appearance by night. At the foot of this monument to American ingenuity the crowd of visitors forms itself into a line, to take turns in listening to the phonograph, which forms a part of the same exhibit. Near this is a monstrous soap-bubble of glass, a yard and a half in diameter, perfectly clear and spherical, blown by compressed air at the watch-crystal manufactory of MM. Appert, and not far off is a block of mahogany, six and a half feet in diameter and thirteen feet high, weighing sixteen tons, perfectly solid, without crack or flaw; and beside this is a piece of ebony, twenty-two inches in diameter and six feet long, also perfect. In another department, an ingot of steel, weighing one hundred tons, nearly twenty-two feet high, and eight and one-half feet square at the base, is, perhaps, the most remarkable object; and the same makers, the Saint-Chamond Company, show also a forged-iron shaft with three angles, weighing twenty-two tons.

AN ARCHITECTURAL KNOCKABOUT.[1] — II.



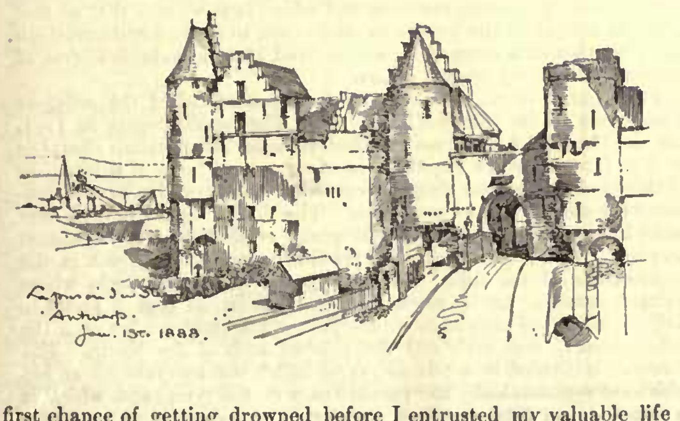
AT Rotterdam I had a room directly over a beer-garden, the noise and smell from which were not altogether conducive to sound sleep. Rotterdam is uninteresting I think, save now and then its houses of nobility and its famous wharves or "*boomptjes*" as they call them.

It became much cooler on the way to Haarlem, and looking from the carriage-window I could see that the canals were rapidly freezing hard.— This was very encouraging as I had always been from infancy a warm admirer of the famous "Hans Brinker" story which had inflamed my fancy to skate upon the Dutch canals. Arriving at Haarlem I was much excited at the prospect of actually gliding over these frozen water-ways, and I then realized completely by the quaint surroundings that I was indeed in "furren parts." I spent a day in the ancient but grand old cathedral with its old windows and cannon-ball prominently but artistically stuck in the wall, and the great organ which was only played in summer, and then only for kings or American millionnaires,— as I was neither the one nor the other, it was not played for me.

I wandered through street after street, the houses presenting the same half-ruined appearance with their stepped gables and with invariably a café or "*bier huis*" underneath. I spent hours with Franz Hals in spite of the cold, doffed my hat to Rembrandt and his contemporaries, and sketched at every opportunity with blue and numbed hands. The bloused and sabotted Hollandais interested me greatly. It was all, in many respects, just as unique and strange as I wanted it to be, yet the faces, and even the dress were not different from our own— though in the country proper it is decidedly different. — I could have spent weeks, however, in poking in and out of its queer corners, crossing and recrossing its boat-loaded canals now firmly locked in an icy seal. Small boys were running through the streets with the ideal skates of my fancy, just as Hans Brinker had them in the story, and I was perfectly satisfied.



Having fully determined to skate upon the Dutch canals, it was comforting to think that these boys would try the ice and run the first chance of getting drowned before I entrusted my valuable life upon them. I inquired of a genial proprietress of a store (where I bought a pair of those curve-bladed skates) if it were possible to skate to Amsterdam? She replied that she thought it was, and remarked that it was seldom that "an Anglais" appeared there in winter and never on the canals.





I took great trouble to inform her that I wasn't an "Anglais" but a regular American. I endeavored to point out to her how the two nations differed, but met with so little success that when I left her, America meant South America to her and she probably placed me as living in the Brazilian mountains or among the wilds of Uruguay. After having expressed my bag to Amsterdam, to a hotel — the name of which suggested cheapness, I boldly sallied forth with my skates on my arm, and with a prayer to Heaven for necessary guidance and preservation on the great deep I followed an interested "small boy" who clogged on to the main canal, passed under the splendid city gate, and stepped onto the direct passage-way to bespired Amsterdam.

It was an ideal experience: for miles and miles a dead level of ice lay before me. The great, white, glistening, snake-like track stretched out circuitously as far as the eye could reach. Sitting down I calmly strapped on my clumsy "irons," and with my sketch books in my sling started off. Being a fair skater I attracted a great deal of attention by my school-boy antics, though the length and peculiarity of my skates somewhat interfered with my most scientific and favorite manœuvres. The natives skate well, slowly and steadily, with a beautiful swing, but with very little of our American "go." I bowled along freely, the air was glorious and invigorating and I found that the fair Hollandaise had no hesitation in asking me to skate with them. Indeed, at one time, I was literally seized by two great buxom lasses, one on each arm, and whirled along at a breathless speed.

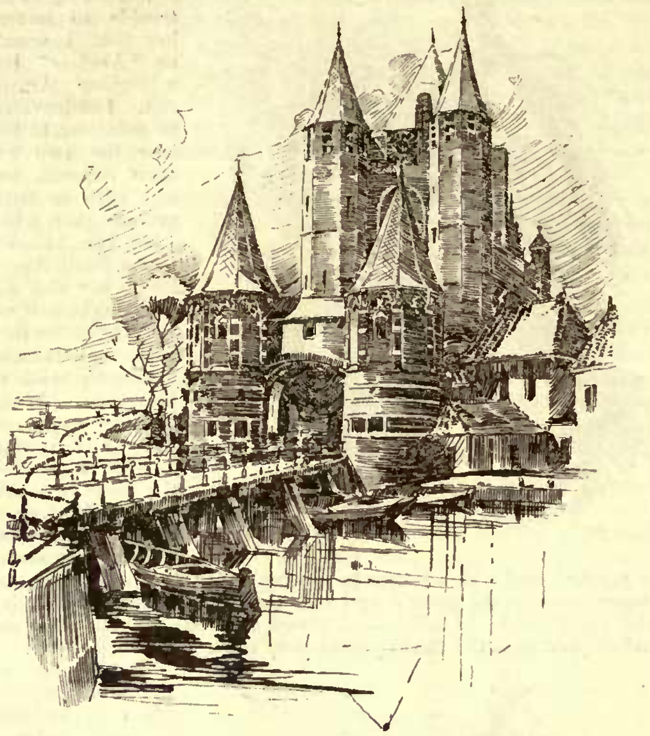




The women, old and young, skate as well as the men, and I found

[1] Continued from No. 706, page 5.

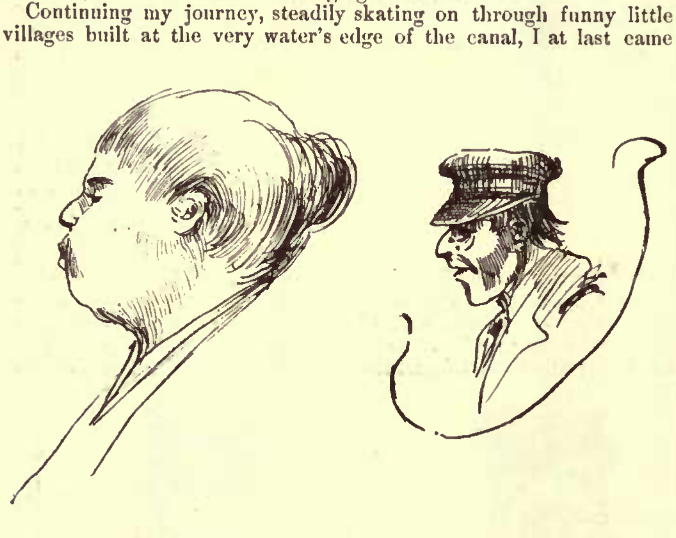
that it was no easy task to skate with these females continuously. At every hundred yards or so there was a crossing where a man with a brush-broom swept the ice for a short space and levied or tried to levy a tax on all passing by. At first I was innocently taken in by the imposition, though I wondered if "Hans" did that. Finally,



after having paid nine different times I got tired and merely pointed back as if I had paid my tax at the last station, this seemed to satisfy these Dutch extortioners.

At every mile or so were small tents with chairs and a man or woman selling hot chocolate, madeira wine and little ginger cookies. These were very refreshing and I found myself continually stopping to try them. I constantly came upon new sights, now and then I would unsling my pack as I went bowling along towards Amsterdam, and take my sketch-books and make some rapid little drawings of an old windmill or quaint thatched farm-house. Arrived at Halfveg, I had to go from the canal for a little space, walking on my skates, and then onto the main way again, not before stopping, however, for more chocolate and ginger cookies.

Continuing my journey, steadily skating on through funny little villages built at the very water's edge of the canal, I at last came



in sight of the splendid city. Putting in all my remaining force I "spurted" in through the suburbs to the very heart of the town.

Leaving the canal I walked through the street in the gathering dusk to my hotel where I found my knapsack. I then, very tired and very happy at the thought of my novel experience, and the realization of one of my fondest dreams, had a good dinner and retired to sleep the sleep of the just and deserving.

On leaving Amsterdam I went by the way of Dordrecht and Utrecht, and in passing the Belgian frontier of course was confronted by the inevitable "*douane*." Not being at all used to these customs formalities and being a free-born American, not to say an inexperienced one, I did not see the use of these continual visitations which seemed to me to be sheer nonsense; so I very foolishly concluded on arriving at the frontier for the second time, that I wouldn't get out of the carriage and walk a long way to be locked up merely to have some ignorant official look through my poor little knapsack.

As I was neither importing salt nor tobacco, all this red tape appeared to me absurd. So every passenger but myself left the carriages and had his luggage overhauled according to law. As no one in authority interfered with me I laughed in a superior sort of a way thinking what a fortunate being I was, when they all returned, but to my surprise two very suspicious *gens d'armes* approached the



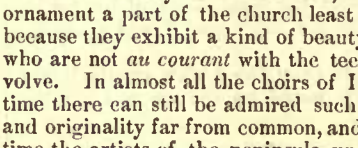
place where I was sitting and literally "yanked" me from the carriage, and went through every article I possessed before the smiling passengers. Not finding anything dutiable on my person, with a few words of Belgian warning in remarkably plain French, I was thrown back into the train a wiser if not a better man. After that I was generally the first one to have my baggage "searched."

F. L. V. Hoppin.

[To be continued.]

ITALIAN CITIES.[1]—VIII.

VERONA.—III.



In the church of Santa Maria in Organo, I must not forget to mention the choir, where we can see very interesting decorations of marquetry and colored woods, executed at the end of the fifteenth century by Fra Giovanni, of Verona, the music-desk richly carved and a walnut candelabra four metres high, for the paschal candle. The art of marquetry flourished in Italy from the thirteenth to the fifteenth century and gave birth to many works which are usually little remarked, not merely because they serve to ornament a part of the church least accessible to the public, but also because they exhibit a kind of beauty hardly understood by observers who are not *au courant* with the technical difficulties which they involve. In almost all the choirs of Italian churches built about this time there can still be admired such works, which possess a delicacy and originality far from common, and which bear witness that at that time the artists of the peninsula undertook to perfect and embellish every portion of a monument, and arrived at an inimitable degree of cultivation in every branch of art.

The Church of St. Anastasia is a curious model of the religious monuments of the thirteenth century. The façade, begun in 1261, has not been finished, as may be seen in many other Italian churches of that date, when the impulse was so vigorous in favor of enterprises of this kind that almost always it exceeded the material means at command for putting it into execution. The Gothic spirit nevertheless rules in this façade, whose single grand central doorway is almost finished. This doorway offers a peculiarity quite uncommon in the architecture of the time. It is composed of a great arch, whose pointed curve is hardly marked at the summit, so that it seems to indicate a kind of hesitation on the part of the architect between the full-centred Roman arch and the pointed arch of the North. The doorway is divided by a pilaster, upon which rest two interior arches which cut symmetrically the vacant space of the tympanum which is ornamented in fresco. The interior is composed of three naves

[1] Continued from page 248, No. 700.

supported by two rows of columns, twelve in each. Here we can remark amongst other things the very beautiful mausoleum of Cattaneo, 1565 — Corinthian in style — which Vassari, who was not always indulgent for his contemporaries, declares to be one of the most beautiful things which can be seen in all Italy. Neither must we forget to observe the singular bas-relief in terra-cotta of the fifteenth century, which depicts the principal events in the life of Jesus. It is a great panel with several compartments on which scenes from the evangels unroll themselves, and stand out with an incredible boldness of imagination.

Sculpture in terra-cotta is also one of the branches of art which people imperfectly educated consider of secondary rank, while by one who takes the trouble to analyze it and study its deserts to the bottom, there is acquired a conviction that the masters of this art have expended for its refining and perfecting as much of study and genius as painters and sculptors have expended in the production of the *chefs-d'œuvre* of brush and chisel.

The church of San Fermo Maggiore, which dates to the early years of the fourteenth century, forms one of the most individual types of Veronese architecture, which, composed of a mixture of foreign styles imported into upper Italy from the north and from the east, nevertheless wished to put on little by little a physiognomy of its own, original, almost autonomic. The bell-towers, arcades and mouldings are here found mixed in strange confusion, and the façade strikes with astonishment the observer who has been accustomed to find in the churches of this century the uniform aspect and conventional pattern imposed by professional pedantry. The door opens at the back of a full-centred porch masked by little columns. Then on both sides of the porch are arranged double ranges of arcades which envelop the design with an unwonted air of animation. Over the porch are four windows with pointed heads, and these windows in their turn are surmounted by a window of slightly pointed form divided into three parts by two colonnettes and flanked by two rose windows, which complete this bizarre architectural theme.

Before speaking of the other monuments of Verona, I cannot avoid speaking of the Church of San Bernardino, founded in 1451, which has for an annex the chapel of the Pellegrini, a very *chef-d'œuvre* of the famous San Micheli, built in Veronese stone, which, after marble, is the most precious of stones for the whiteness of its tint and fineness of its grain. The Church of San Bernardino possesses a cloister of severe majesty and imposing austerity, due especially to the simplicity of its design and the wise distribution of daylight through its arcades.

Besides this rich collection of churches, Verona possesses a beautiful series of palaces, the most interesting of which, from a decorative point-of-view if not from that of purity of style, are those built after the designs of San Micheli, all of which date from the first half of the sixteenth century. San Micheli, the Veronese architect, was one of the greatest artists of his age. He lived and worked in company with the most distinguished architects of his century, notably with Sansovino, Bramante, San Gallo, and Buonarotti. He was almost the equal of each of them, and no one of them was his equal in military architecture in which he excelled. We owe to him the invention of the triangular bastions which revolutionized the strategy of sieges. The fortifications of Verona, almost all still standing, perfectly preserve the type of these new works of defense due to his inventiveness. He had acquired such a reputation in this branch of his art that Pope Clement VII charged him, in company with San Gallo, with the inspection of all the fortified cities of the States of the Church. The Venetian Republic next employed him, and thus it is that, besides Verona, he fortified all the strongholds of Venetia, Dalmatia, Corfu and Candia. In those agitated centuries, where the security and the power of States rested wholly upon force, almost all the great architects were bound to understand how to put a city in condition for defense, and one of the most brilliant pages of the life of Michael Angelo is that where he was seen, at an already ripe age, presiding over the defense of Florence, his natal city.

In spite of the care which he was forced by circumstances to give to purely military works, San Micheli none the less consecrated his talents to the designing of edifices purely civil or religious, which would have been enough to assure him a great fame. The two altars of the Cathedral at Orvieto, the façade and dome of the Cathedral of Montefiascone in Central Italy, the Chapel of the Church of St. Anthony at Padua, and innumerable works which he left at Verona, palaces, church fronts, bridges, gateways and walls of fortifications, bear witness to his fecundity and the unheard-of variety of his information.

Among the palaces which are due to him I will cite in the first place the Palazzo Canossa, ornamented with a sub-basement in rustic work, and composed of a single story, the windows of which, framed in pilasters and surmounted by full-centred arches, are enriched at the summit with an ornamental moulding in the slightly *baroque* taste of the time. The attic, loaded with statues, which crowns the edifice, is of a later date, and only accentuates the incontestably *baroque* and heavy character of the monument.

The Palazzo Bevilacqua is conceived in a theme still more complicated and manneristic, for the rustic work of the basement is cut by a terrace which traverses the whole façade, and forms the base of the first story, whose windows, of great size, are divided by Corinthian columns, cannelated or *en torsade*, of sufficiently corrupt style. The windows of the lower story and those of the upper story are, moreover, overloaded with busts, statues and sculpture, which render the aspect very far from light, and the crowning of the façade is formed by a frieze and cornice very elaborately ornamented. One must go into the court-yard of the Palace of the Prefect if he wishes to find a model of charming and almost Classic architectural simplicity. Round about the court-yard ranges a portico formed by full-centred arcades supported by Corinthian columns of a very bold elongation. The first story is composed of a range of windows inframed in columns and with pointed arches, whose design harmonizes very successfully with the arches of the portico.

The court-yard of the Palace of the Tribunes is stamped with the same Classicism, only here the columns incline more towards the Byzantine standard, are more squat, rest on bases more massive, but on the other hand the arcades are more widely spaced, more attenuated, and consequently show more boldness and lightness.

The Palazzo Pozzoni is a model of elegance and distinction, although all the windows are not placed in symmetrical order. The general appearance of the façade has a very distinguished air, and the window which opens above the porte-cochère, as well as the one which is at its right, can be considered a very satisfactory specimen of the Greco-Gothic style which prevailed at Venice.

Finally, I cannot finish this summary review of the most beautiful palaces with which Verona is honored without mentioning the Palazzo del Consiglio, with its elegant terrace on the lower floor, its marble balustrade, its round-arched portico, its slender and distinguished columns and its four windows parted by colonnettes, and capped by a richly decorated entablature. All of these palaces have, in general, a sombre and severe air proper to the seigniorial habitations of that age, when every noble was a man exposed to the reprisals of factions, and where consequently a palace had to be at the same time a fortress as well as a place for pleasure, rest and repose; but, in general, the architects of this age of iron always succeeded in, so far as possible, disguising this prosaic side of their work. To-day the architect is no longer preoccupied with necessities of this kind; but, nevertheless, the palaces which are built cannot always rival in elegance and beauty those of the warlike feudal times.

In the centre of the Piazza del Seignori, which faces the Palazzo del Consiglio, stands the monument of Dante Alighieri, and in a corner we see rising up a superb Gothic tower. The statue of Dante is of white marble, and was sculptured by Ugo Zanoni, a Veronese artist. But the most eccentric place in Verona, and one might say of all Italy if he took care to except the Piazza of St. Mark at Venice, is that called della Erbe, formerly the forum of the Republic. The houses which surround it are almost all decorated in fresco. The monolithic column which rises at one end, bore, until 1797, the lion of St. Mark, a symbol of the subjugation of Verona to the Venetian Republic. At that time the French cast it down. The tribune, borne on four columns, which we see on the opposite side, formerly served as the stand of the judges charged with presiding at the punishment awarded to blasphemers, and whence they declared the death sentence. This place offers a very varied and very picturesque scene on market-days, when every dealer in fruit and vegetable shelters himself while selling his wares under a vast open umbrella. What we see, then, is a very forest of parasols, under which busies itself a swarm of human beings, and the murmur of voices which arise from every side only makes the scene more odd and animated.

Besides the statue of Dante we see in other parts of Verona the equestrian monument of Victor Emmanuel, the liberal king, whose statue is already erected in almost all the great cities of the kingdom; also the statue of San Micheli; and finally, that of Aleardo Alcardi, a conspirator and poet, born in Venice in 1815, persecuted by Austria, and kept prisoner in the fortress at Josefstadt with several other Italian patriots. Alcardi's poems, conceived in a collegiate style, are much liked and appreciated; and I must mention one of his poems in which he pictures in strong and vivid touches the desolate picture of the Roman Campagna, where malaria overwhelms each year its thousands of victims.

On quitting Verona we can cast a last glance at the tomb of Juliet, the authenticity of which it is just as well for the dreamer not to question if he desire to say with the grand English poet:

> "For here lies Juliet, and her beauty makes
> This vault a feasting presence full of light."

H. MEREU.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

THE CITY-HALL, ALBANY, N. Y. MR. H. H. RICHARDSON, ARCHITECT.

[Gelatine Print, issued only with the Imperial Edition.]

OFFICE-BUILDING FOR F. L. AMES, ESQ., BOSTON, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

THE Worcester *Spy* says that Norcross Brothers have just signed a six-hundred-and-twenty-five-thousand-dollar contract to build a twelve-story building for F. L. Ames, at the corner of Washington and Court Streets, Boston. It will be not only the tallest business block in the city, but one of the most striking architectural features of the picturesque old town. No adjacent building is more than five or six stories high, and more than one-half of the altitude of the building (184 feet) will tower with unobstructed view above everything else in the neighborhood. The Ames Block will have a frontage of seventy-eight feet on Washington Street, and ninety-three feet on Court Street. The first three stories will be of Milford granite, and the remaining nine stories of gray Ohio sandstone, a combination similar to that so much admired in the new building of the New York *Times*. The basement, ten feet high, will have square windows, but the first story, directly above, will be twenty-five feet high, and will be lighted on each side by three arched windows of generous dimensions. In the third story is a row of many arched windows of smaller size, and an elaborate cornice above completes the design of the granite section. In the fifth story above this there are large arched windows similar to those on the first floor. The windows of the topmost story are small arched windows, while those on all intervening stories are square. From foundation to roof the corner windows are set in continuous solid masonry that projects beyond the central portion of the structure and gives the effect of pilasters. Sculpture and mosaic will be used liberally on the exterior, and the interior finish will be worthy of marble and iron. The first floor is designed for banking-rooms, and there will be room for safe-deposit vaults in the basement.

THE SASSENPOORT, ZWOLLE, HOLLAND.

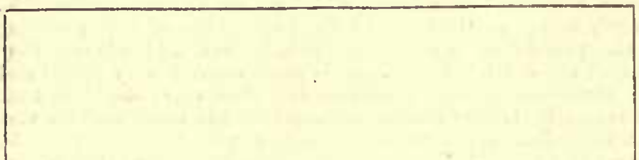
PUBLISHED in connection with "An Architectural Knockabout," elsewhere in this issue.

THE WATERPOORT, SNEEK, HOLLAND.

PUBLISHED in connection with "An Architectural Knockabout," elsewhere in this issue.

TWO HOUSES AT PITTSFIELD, MASS. MESSRS. MELLEN, WESTELL, & KIRBY, ARCHITECTS, NEW YORK, N. Y.

COPPER.



Triumphal Arch erected for the Celebration at New Orleans, La., of the taking of the Bastille.

A CORRESPONDENT of the Boston *Herald* offers the following readable communication:

"The amount of copper which is now accessible, the extent of the facilities for obtaining it and of the capital engaged, make it reasonably certain that the price of ingot copper will remain low for a long time. The low price of the raw material favors its increased consumption in the many uses to which it is, on account of its peculiar properties, preëminently adapted, in addition to those to which, for the same reason, it is indispensable. For example, for electrical use, it is indispensable, and the consumption of the metal in electrical industries will consequently be but little affected by the price in comparison with those industries which can effectively employ a substitute. It is better adapted for culinary ware, for conveying steam and for a multitude of uses in manufacturing than iron is, but the latter is so much cheaper as to outweigh the greater advantages of copper, at least in this country. In Europe, where cooking is an art, and economy of material and fuel and uniformity of products are expected, cooks will not use the clumsy black and greasy pots which have been handed down to our Irish kitchen-maids from the backwoods poverty of our ancestors. In all buildings where regard is had for solidity and permanence of construction, copper is used for roofing, for piping for steam, hot-water, etc. We have to be content with galvanized-iron for such uses. We are, however, producing copper in such quantities as to be able to send a surplus abroad and increase the opportunities of Europeans to use it by selling it to them at a lower price than to ourselves. This is, of course, a direct, though absurd and unexpected, result of the duty on copper. But when you add to the tariff its inevitable corollary, the manufacturers' combination, the use of copper, except in a few branches where it is indispensable, is almost prohibited. Before the metal can reach the coppersmith, who works it into the unlimited forms required for general use, it has to pass through the hands of the manufacturer, who rolls it into sheets or draws it into tubes, rods or wire.

"Thanks to the tariff, these gentlemen have combined together to maintain an artificial price and, as a result, to restrict consumption. For conveying steam and hot water it is superior to iron; first because smaller and lighter pipe can be used, angles and bends are more easily managed, and when in place, the piping is more workmanlike and durable; second, because the loss of heat by radiation is only a tenth of that of iron. Now the cost of copper pipe is out of all reasonable proportion to the cost of the raw material. The actual cost of manufacturing iron pipe from skelp averages six-tenths of one cent per pound, which includes all expenses of handling, shipping, sales and profits. To manufacture copper tubes from the ingot costs apparently more than twenty times as much, for if we take our copper to the pipe-makers at twelve cents a pound they will not let us have it back for less than twenty-five cents a pound. Yet copper exceeds iron in malleability, ductility and facility of working. Of course the consumption is trifling, and always will be so long as these men can keep their grip on it. It is easier to run up the price, and so restrict consumption, than it is to provide increased facilities to meet a greater consumption. You don't have to put out more capital, and you have an immediate greater profit. You don't have to worry about a home market; there isn't any to speak of, it is simply an affair of fixing the price to suit yourself, and letting consumers take the goods or go without them altogether. It is not a market where the buyer is always at the mercy of the seller. A few days ago bids were opened for roofing with copper the new court-house in this city. Among the bidders was one party who offered to do the work for a price averaging more than forty per cent less than his competitors. Being interested in any question affecting the use of copper, I made inquiries and found that the lower bidders, in order to get around the manufacturers of copper, had fitted up a mill, and now roll their own copper. Any of the others who are tribute payers under the sway of the monopoly would have had to pay heavily to it for the privilege of being allowed to do the work, in case the successful and independent firm had not bid. It would seem that this is a good example to follow, and consumers who have been looking in vain for signs of a home market, in which to buy without being robbed, had better get themselves in position to do without it, by obtaining the raw material and working it up themselves."

PIPING A HOUSE FOR GAS.

THE correspondence in our columns some months since on the piping of houses for the introduction of gas has induced the Gilbert & Barker Manufacturing Company to issue a circular which will be found to contain information which architects will do well to heed in preparing their specifications. As an appropriate sequence to the discussion we reproduce it at length below.

Ordinary wrought-iron pipe, such as is used for steam or water, is suitable and proper for all kinds of gas. Galvanized malleable iron fittings, in distinction from plain iron, are very superior. The coating of zinc inside and out effectually and permanently covers all blow-holes, makes the work solid and durable, and avoids the use of perishable cement. Before the pipe is placed in position it should be looked and blown through. It is not infrequent that it is obstructed, and this precaution will save much damage and annoyance. What is known as gas-fitters' cement never should be used. It cracks off easily, in warm places it will melt, and it can be dissolved by several different kinds of gas. Nothing but solid metals are admissible for confining gas of any kind. When pipes under floors run across floor timbers, the latter should be cut into near their ends, or where supported on partitions, in distinction from being cut in or near the centres of rooms. It is evident that a ten-inch timber notched two inches in the middle is no stronger than an eight-inch.

All branch outlet-pipes should be taken from the sides or tops of running lines. Bracket-pipes should run up from below, in distinction from dropping from overhead. Never drop a centre pipe from the bottom of a running line. Always take such outlet from the side of the pipe. The whole system of piping must be free from low places or traps, and decline toward the main rising pipe, which should run up in a partition as near the centre of the building as is practicable. It is obvious that where gas is distributed from the centre of a building, smaller running lines of pipe will be needed than when the main pipe runs up on one end. Hence, timbers will not require as deep cutting, and the flow of gas will be more regular and even. For the same reason in large buildings, more than one riser may be advisable. When a building has different heights of post, it is always better to have an independent rising pipe for each height of post, in distinction from dropping a system of piping from a higher to a lower post, and grading to a low point and establishing drip pipes. Drip-pipes in a building should always be avoided. The whole system of piping should be so arranged that any condensed gas will flow back through the system and into the service-pipe in the ground. All outlet pipes should be so securely and rigidly fastened in position that there will be no possibility of their moving when the gas fixtures are attached. Centre pipes should rest on a solid support fastened to the floor timbers near their tops. The pipe should be securely fastened to the support to prevent lateral movement. The drop pipe must be perfectly plumb, and pass through a guide fastened near the bottom of the timbers, which will keep them in position despite the assaults of lathers, masons, and others. In the absence of express directions to the contrary, outlets for brackets should generally be four feet and six inches high from the floor, excepting that it is usual to put them six feet in halls, and five feet in bathrooms. The upright pipes should be plumb, so that the nipples that project through the walls will be level. The nipples should project not more than three-quarters of an inch from the face of the plastering. Laths and plaster together are usually three-fourths of an inch thick; hence, the nipples should project one and one-half inches from the face of the studding. Drop centre pipes should project one and one-half inches below the furring, or timbers if there be no furring, where it is known that there will be no stucco or centre-pieces used. Where centre-pieces are to be used, or where there is a doubt whether they will be or not, then the drop pipes should be left about a foot below the furring. All pipes being properly fastened, the drop pipe can be safely taken out and cut to the right length when gas-fixtures are put on. Gas pipes should never be placed on the bottoms of floor timbers that are to be lathed and plastered, because they are inaccessible in the contingency of leakage, or when alterations are desired, and gas-fixtures are insecure. The whole system of piping should be proved to be air and gas tight under a pressure of air that will raise a column of mercury six inches high in a glass tube. The pipes are either tight or they leak. There is no middle ground. If they are tight the mercury will not fall a particle. A piece of paper should be pasted on the glass tube, even with the mercury, to mark its height while the pressure is on. The system of piping should remain under test for at least a half-hour. It should be the duty of the person in charge of the construction of the building to thoroughly inspect the system of gas-fitting; surely as much so as to inspect any other part of the building. He should know from personal observation that these specifications are complied with. After being satisfied that the mercury does not fall, he should cause caps on the outlets to be loosened in different parts of the building, first loosening one to let some air escape, at the same time observing if the mercury falls, then tighten it and repeat the operation at other points. This plan will prove whether the pipes are free from obstruction or not. When he is satisfied that the whole work is properly and perfectly executed, he should give the workmen a certificate to that effect, and no job of gas-fitting should be considered complete until such certificate is issued. The following scale of sizes of pipes and number of burners to be supplied therefrom is found by experience to be best adapted for securing a good flow of common city gas, and it is very important that it be rigidly observed when machine or air gas is to be used. Do not confound fixture outlets with burners. In establishing the sizes of pipe in a building, count the number of burners that there will be on each outlet, and have the pipes of a size to correspond therewith.

Greatest Number of Feet to be Run.	Size of Pipe.	Greatest Number of Burners to be Supplied.
20 feet.	3/8 inch.	2
30 "	1/2 "	4
50 "	3/4 "	15
70 "	1 "	25
100 "	1 1/4 "	40
150 "	1 1/2 "	70
200 "	2 "	140
300 "	2 1/2 "	225
400 "	3 "	300
500 "	4 "	500



AN OWNER'S RIGHT TO GIVE ORDERS.

REFERRING to the communication of Mr. C. E. Gardiner, in the *American Architect* for June 29, we agree with the editorial answer in that issue to the extent that the architect could not receive a commission for superintending the work in case he should voluntarily withdraw by reason of dissatisfaction at the owner's changing his mind; nor probably could he in such case recover damages for not being permitted to superintend the work according to the original plans. But we think he would have this remedy: he could decline to superintend the work any further, deliver the plans to the owner for his use, and then recover the reasonable value of the time and labor spent upon them. If these were complete, the usual three per cent could probably be collected; if incomplete, only a proportionate amount.

Of course the solution of this and all similar questions depends upon what in fact was the agreement between the architect and the owner; that is upon the exact nature of the architect's "retainer," to use a legal phrase. In general, however, the architect's undertaking is undoubtedly two-fold and divisible: he is in the first place to prepare the plans, specifications and details, which he is either to furnish outright to the owner as the latter's property, or, as is frequently the case, the owner is simply entitled to the use of the plans, the property in them remaining in the architect; in the second place he is to superintend the execution of the work according to these plans. We have no doubt that it is an implied condition of this contractual relation that the owner shall permit the work to proceed substantially as conceived by the architect, or at any rate there shall be no such deviations from the plans as would, to quote our correspondent's words, "ruin the design of the structure, even if it would not jeopardize the safety of the building." Now, of course, such an implied condition would not in law prevent the owner from doing as he chose with his own property; if he chose to throw over the architect's design and erect some architectural monstrosity, he undoubtedly would have the right to do so; the architect cannot interfere. But we think that such conduct on the part of the owner is clearly a breach of his implied undertaking with the architect, implied we mean as a matter-of-fact, and not by construction of law; and such breach, rendering the performance of the architect's contract as originally agreed upon impossible, would on general principles absolve the latter from further performance, and entitle him to compensation for what he had already done. This compensation would doubtless, as already pointed out, be fixed by a jury at the customary three per cent, or less in case the plans were not complete, or more in case of partial superintendence.

We think that if architects generally would pursue some such course as we have indicated, a salutary check would be placed upon the architectural willfulness of their clients, particularly building-committees.

RELEASE OF MECHANICS' LIENS.

BALTIMORE, MD., July 1, 1889.

Question. — Please publish in the columns of your paper a blank form for "Release of Liens." Does this release from a contractor secure the owners against mechanics' liens?

Yours truly, *C. E. Gardiner.*

Answer. — The following will do for a release from any single individual or firm, including the contractor:

"Know all men by these presents that in consideration of —— dol-
"lars paid by —— —— to ——, the receipt of which is hereby
"acknowledged, —— hereby release and discharge the following
"described premises of and from all liens or claim of lien which ——
"now have against the said premises or the buildings thereon by virtue
"of any work done or material furnished for the same. [Here insert
"description.]

"Witness —— hand and seal this —— day of —— 18 —."

[Seal].

The release from a contractor would secure the owner against liens by him only; and the above form would not prevent the contractor from putting on a lien for work done subsequently to the execution of the release. If the agreement is that no lien shall be placed upon the premises for future work, a provision to that effect should be formally incorporated in the contract or in a separate instrument.

If the object is to get a release from the contractor's workmen and material-men, the above form can be used, changing the testimonial clause so it shall read as follows:

"In witness whereof we hereby set our hands this —— day of ——
"18 —, and adopt as our common seal that as hereto annexed."
One seal will do for the whole; and of course all parties who may by any possibility have any lien should join.



[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

SALTS ON THE SURFACES OF WALLS.

NEW YORK, N. Y., June 23, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — I have read many letters in your paper respecting the white salts that so often appear on the walls of buildings. Believing it to be a question of great importance, not only to owners of buildings, but also to architects and builders whose best efforts are oftentimes marred and ruined by the unsightly disfigurations and

destructive effects of the salts, I address you and give you my quarter of a century's experience and observation thereon.

It is a rare thing to see a building of brick or stone not subject, more or less, to this disfigurement. As to the elements of which these salts consist, they are so varied that scarcely any two samples are alike: specimens taken from the walls of the same building will differ.

The salts are contained in brick, stone, mortar and cement; they appear to exist in the largest proportion in cement, next in mortar, then in brick and the least in stone. I have seen them on stacks of new bricks in the brick-yards after rain had fallen upon them.

The *cause* of their appearance is wholly due to moisture in the masonry; this dissolves the salts, forming a weak brine, which, upon coming to the surface, loses its water by evaporation, and leaves the salt to crystallize and form the objectionable efflorescence; the loss of these soluble salts also greatly weakens the cement or mortar. But some of these salts, in a soluble form, are indispensably requisite for making good mortar and cement. If lime, silica, etc., were not in a soluble form in mortar and cement, the chemical changes and combinations necessary to produce their hardness and adhesiveness could not be effected: hence it will be seen that these salts are useful and necessary in their proper place, *i. e.*, *inside* the wall and *in* the cement or mortar, where in course of time they combine and form, by crystallization, strongly united and durable substances.

The question then arises, can the salts be retained within the walls and their objectionable appearance prevented? As water is the sole cause of the appearance of these salts, therefore the only remedy is to keep the walls dry: this can be accomplished by the proper application of a waterproofing substance that is not affected by the said salts, and as they have an alkaline reaction it follows that linseed oil, or any compound containing linseed oil or other vegetable oils cannot be successfully used, because as soon as the oil comes into contact with the salts it is saponified, becomes soluble in water and hence useless. This can be seen on any brick wall that has been painted shortly after erection, especially near the top where it is most exposed to the weather and consequently the wettest; the mortar joint is the first to throw off the paint, due to the caustic alkaline property of the lime hydrate. I know of no varnish, suitable for this purpose, that will resist the action of alkalies.

It is clear, then, that the remedy must consist in preventing rain-water from entering the walls of buildings by perfectly filling the interstices of the brick, stone, mortar, etc., with a substance or compound wholly unaffected by alkalies, water, gases, ordinary heat, cold or other atmospheric influences. If this can be effectually and permanently done, then the salts will not appear and cause those objectionable and destructive efflorescences. Such a compound would also preserve brown and other sand stone from the decay so noticeable on many of our finest buildings.

Robert M. Caffall.

NOTES AND CLIPPINGS

How a One-armed Man Built His Own Home.—On Highland Avenue, Malden, stands a large and handsome stone house, which, having been in process of construction for the past four years, has at last arrived at completion, and is now pointed out by the inhabitants as a standing witness of what the skill and industry of one man, alone and unaided, can accomplish. The builder is a one-armed man, Mr. C. O. Blomerth, who has been a newsdealer in Malden for the past thirty-two years. When seen yesterday afternoon he related the story of the work as follows:

"In 1886 I started to build a house, and as I had previously built a small one alone, I determined to build a home for myself and family on which no labor but that of my own should be expended, and I have at last accomplished my task, the only help I have had being to have a man mix my mortar. The house is built of rough stones, of such a size that a single man could handle them, laid in red mortar, and is three stories high. The trimmings are of brick, and inside the stonework is a complete wooden frame house. The roof is made of roofing paper fastened together with a composition of my own, which is also used around the chimneys and in various other places instead of lead or tin. In the second year of the work, while busy near the roof, I fell a distance of thirty feet, and was so badly injured that I could do nothing more for a year. Of course, my one arm has been a severe drawback, but I have managed by various devices and a liberal use of nails, to get along very well. I have built all my own scaffolding, and put in without help the roof timbers. I paint everything thoroughly before putting it up, so that after finishing I have not had the trouble of stagings and ladders to paint high places. The house is large and commodious, and is filled with many odd little ideas of my own. It also contains some interesting relics; my front steps are taken from the Universalist Church here, and are the same steps that I set up on that church thirty-five years ago, when I had two hands."

Mr. Blomerth is a Swede by birth, and came to this country thirty-five years ago. He lost his right hand thirty-two years ago in a mill accident, and since that time has sold papers in Malden. He is a bright, energetic man, and now that he has a home proposes to rest and enjoy it.—*Boston Herald.*

Sugar in Steam-making.—The incrustation of steam-boilers has always been a matter of pressing importance to engineers, and many remedies have been proposed to obviate what is not only an inconvenience but often a source of danger. The incrustation is due to the mineral matter, chiefly lime, which is contained in all hard waters, and which is deposited on boiling, as we can see by looking into any kettle that has been in use for even a short time. A simple remedy has been tried by an Italian engineer, Colonel Potto, and it is said with complete success, in a boiler of twenty horse-power, containing 126 tubes. He introduced into the boiler every week two kilos. (about four and one-quarter pounds) of sugar, with the result that, after four months' continuous working, only a very thin film of incrustation was formed, and this was easily removed by simple washing. Without the treatment with sugar, the same boiler had previously become incrusted in a period of six weeks. The method has the merit of simplicity and cheapness, and many will therefore be disposed to test its efficacy.—*Chambers's Journal.*

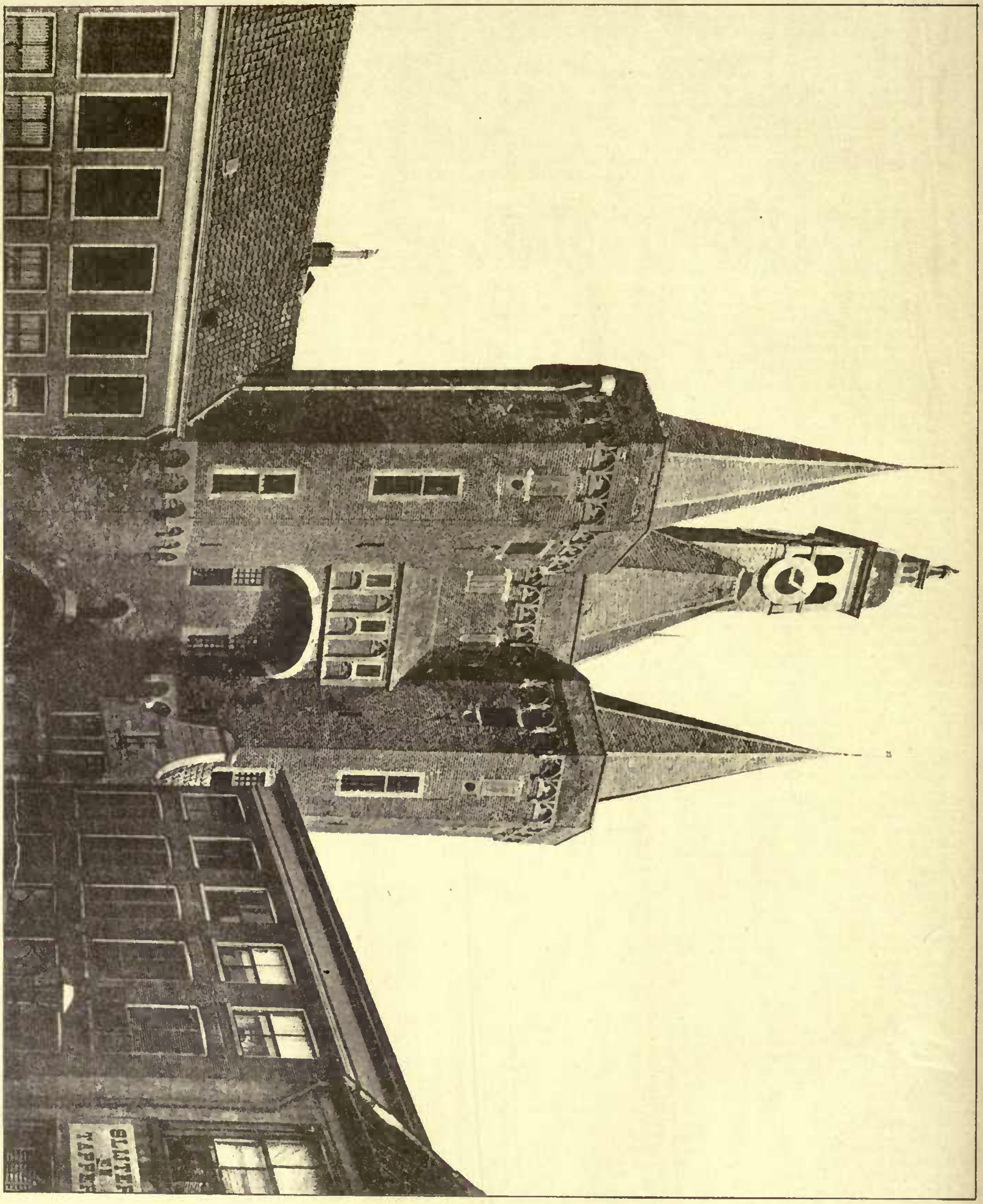
Coal-dust Explosions.—Those who are inclined to be sceptical upon the subject of the combustibility of coal-dust will do well to note the recent explosion on board the steamer "*Eugene Pereire*" in the harbor of Marseilles. A heavy slip of coal occurred in one of the bunkers, which was open at the time, and a dense cloud of dust floated out and came in contact with the flame of a lamp in the stoke-hole. A terrible explosion ensued immediately, severely burning four stokers, one of whom afterwards died.—*Fire and Water.*

TRADE SURVEYS

Cereal estimates for the current year afford stock speculators and promoters of new enterprises a great latitude for new operations. Railroad investments this year will fall considerably under the limit of two hundred million dollars, and investments in manufacturing enterprises will considerably exceed three hundred millions. While less than the usual amount of railroad building will be done, more than the average amount of new land will be taken up for farming, mining and grazing purposes. While there is a great falling off in speculation, the increase in the volume of legitimate business is a matter of general comment. The number of forced sales are declining with reference to the volume of business done, and the amount of business done outside of banks is increasing. This year has been characterized by the great increase in the number of little business men and shop and factory proprietors. While mighty combinations are numerous, petty concerns are springing into existence at a greater rate than ever before known. Two causes are sometimes assigned for this: viz., the long and short haul clause, and the effect of industrial development in the South and railroad development in the trans-Mississippi region. Builders and building material men who supply material all over the United States say that there is a much greater activity in building in the far West than is generally supposed. Other authorities say that in the South there is an enormous expenditure of money for machinery, plants, equipments, boilers and engines. At this time, orders are in Northern machinery establishments for two or three million dollars' worth of machinery. These figures could be safely multiplied by five. There is a feverish contest between users of machinery. The machinery of greater capacity is driving out machinery of lesser capacity. In this way, a destruction of property in an economic sense is going on, the full effects of which are not always taken into account. Among the new Southern enterprises now in view are between twenty or thirty cotton-mills, four or five woolen-mills, four rolling-mills, eleven blast-furnaces, three thousand miles of projected roads, and small shops and manufacturing concerns too numerous to keep track of. In the Northwest territory, which is commercially tributary to Chicago, over twenty towns were started last year with a backing that promises to make young cities out of them in a few years. Country elevators are springing up. Railroad machine-shops are projected, to say nothing of stove and other foundries and shops of a hundred kinds. The manufacturing interests East are feeling the first influences of these rising centres. They promise to become valuable markets.

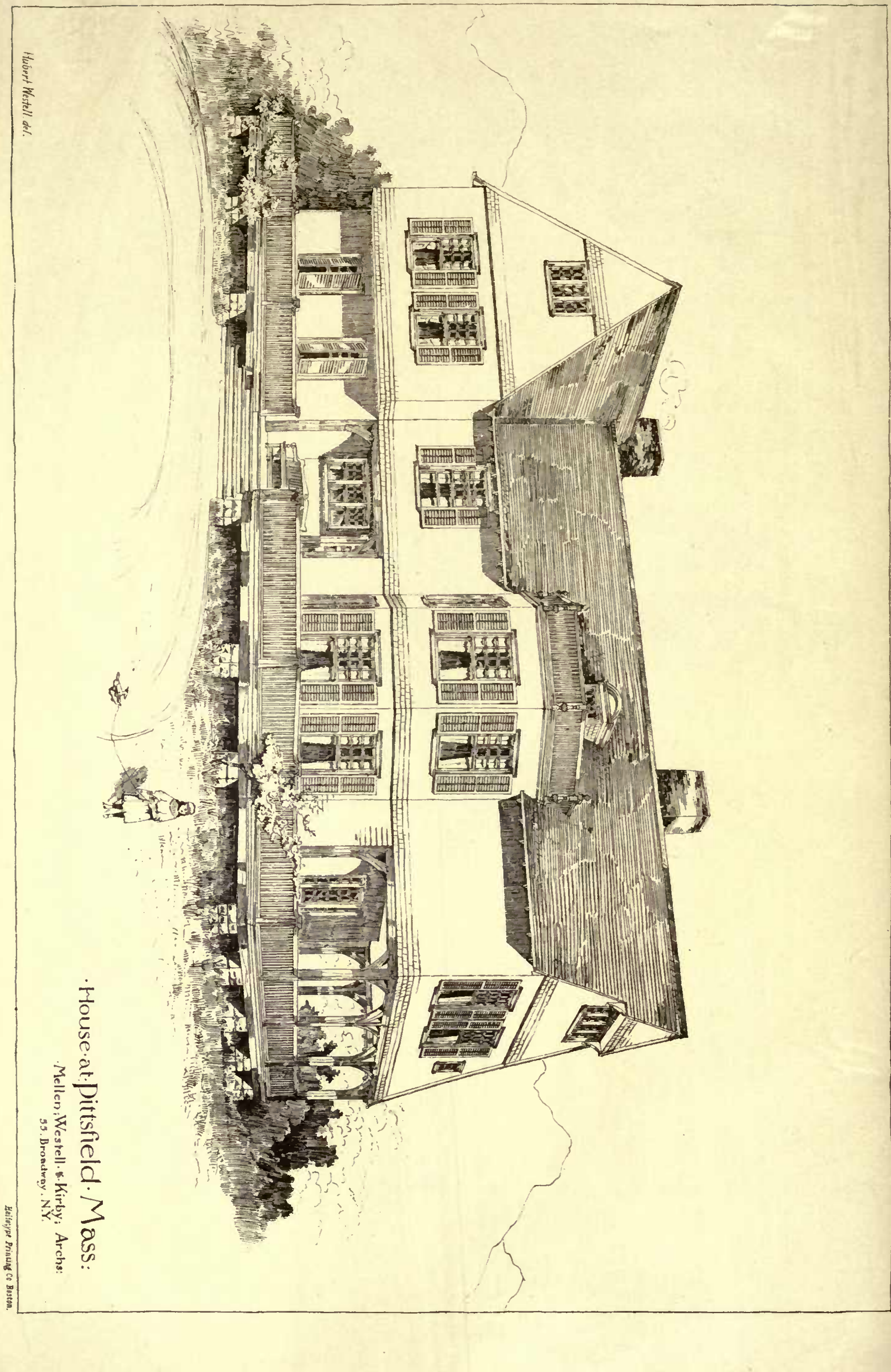
The price of land for agricultural purposes it is to be observed is increasing in four or five Western States. Some attribute this to lower freight rates, others to the growth of near-by markets, others to the general increase in demand; all causes contribute. The Northwestern agricultural interests are threatening to devote themselves too exclusively to one or two products as the South once did, but the success of our European and Asiatic competitors will soon give a strong hint to our enthusiastic farmers of the mistake they are about making in an economic sense. A greater diversification of farm labor is imperative. The South has learned the lesson. Theorists are urging ramie and flax culture and sugar-plant culture, and other specialties. No doubt that eventually our farming interests will see it to their advantage to act upon some of those suggestions, but the American way of doing things interferes with the easy adoption and enforcement of those wise little steps that in the long run count for so much. The market conditions are generally favorable; but little more gold will be exported. Exporting interests look for an equalization in accounts in products. Dry-goods are still imported very largely, and American textile interests are fairly employed, though the margins on common goods are so low as to tempt a restriction of output. Complaints of low prices come from a good many Southern mills, and critics advise their managers to escape from competition by turning out higher grades of goods; advice more easily given than acted upon. The boot and shoe interests have no cause of complaint which do not apply to almost any and every other industry. In specialties alone are there any profits. The machinery-makers have entered on the last half of the year with excellent profits, abundant orders and lower-priced material. The bridge-builders have orders out for twenty thousand tons of material to be erected during the next eight months. The rail-makers have begun to pick up good orders; the pipe-makers are busier than they have been for a year, and crude-iron is selling for 50 cents per ton more than two months ago. The great body of manufacturers are making preparations for an enlargement of capacity. Jobbers have ceased to fear a collapse of prices. There is confidence and faith on every hand, even as to railway matters. The iron-workers have gained their point. On the Alleghany Mountains the fifteen thousand miners are half-inclined to strike. In the block coal fields there is a good deal of suffering, but throughout the ranks of labor, generally, there is nothing more than the usual chronic causes for discontent. The leaders see and feel that there is too little compact organization for a general eight-hour strike. One railroad president has by a single edict rooted out labor organizations among thirty-five thousand employés. The fever has spent its force.

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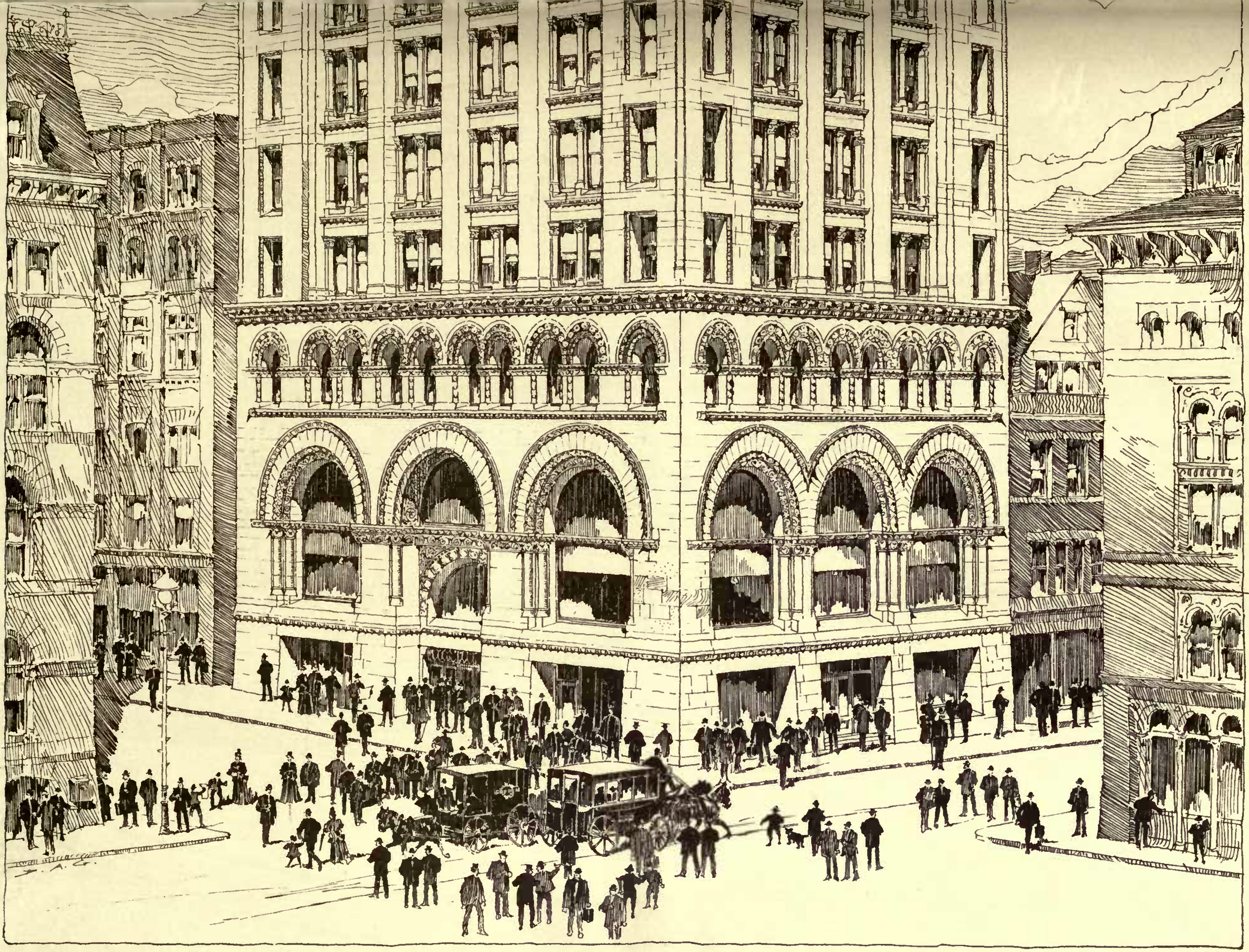


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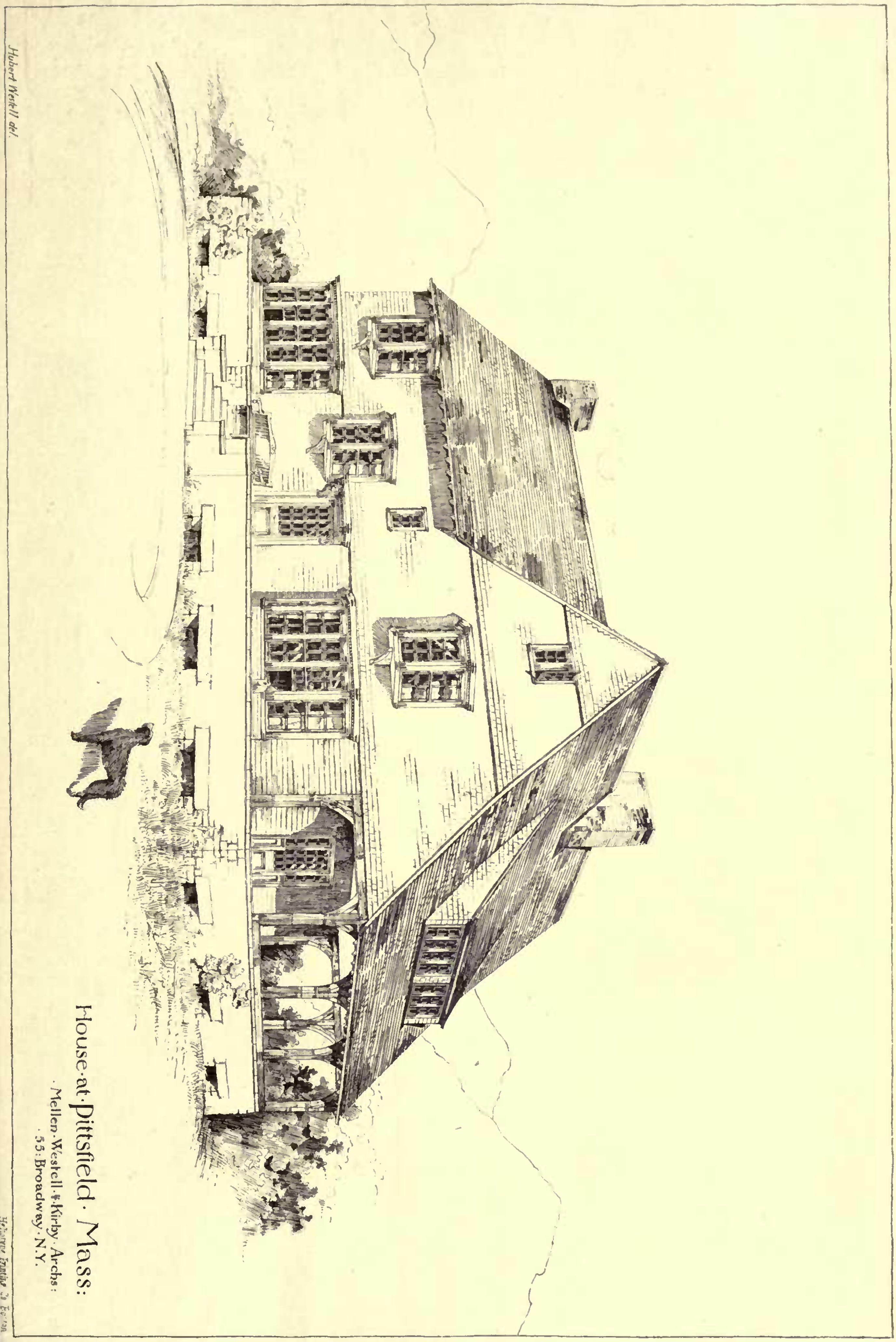


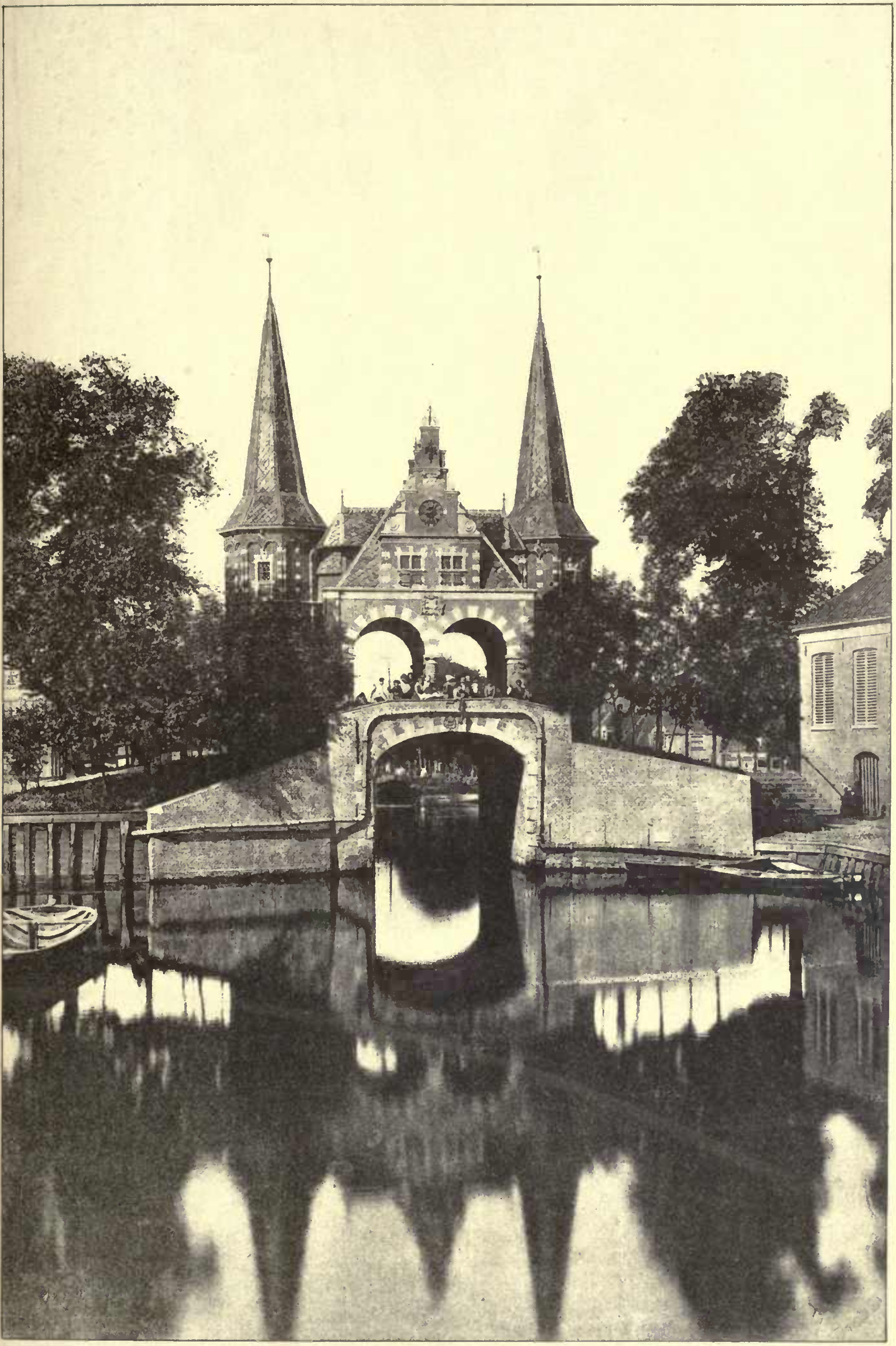
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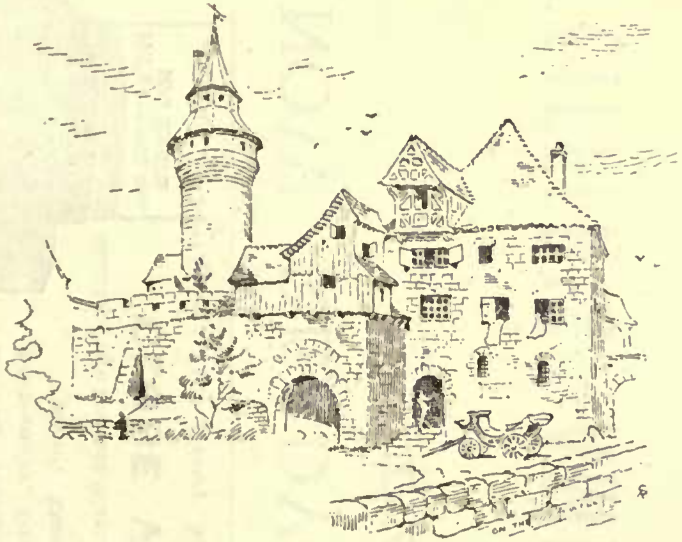
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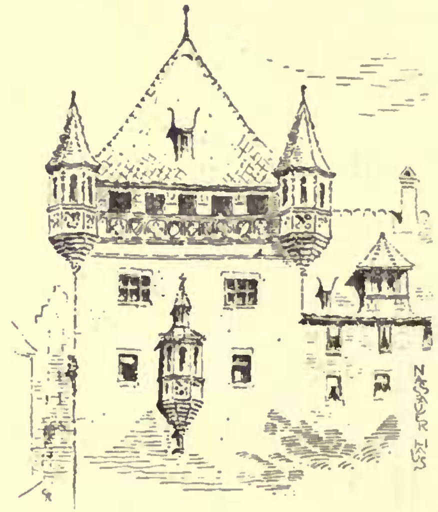
THE CITY HALL, ALBANY, N. Y.

H. H. RICHARDSON, Architect.

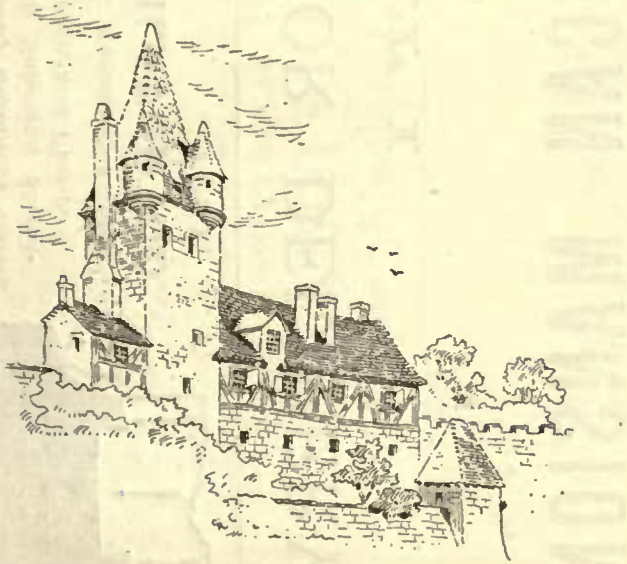


The Castle.



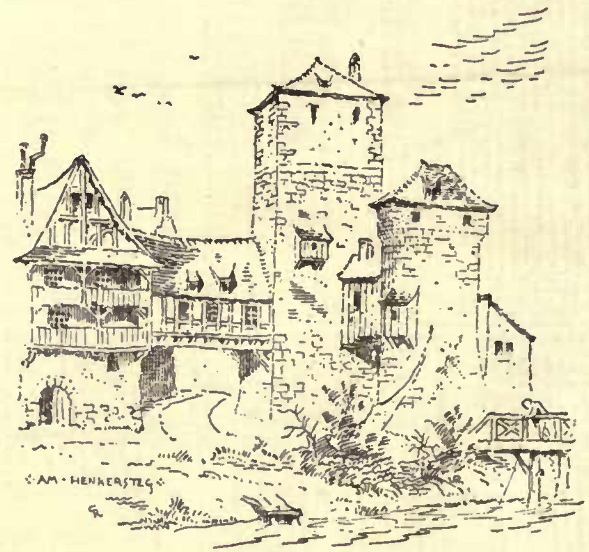


Nassau House.





Rothe Ross.



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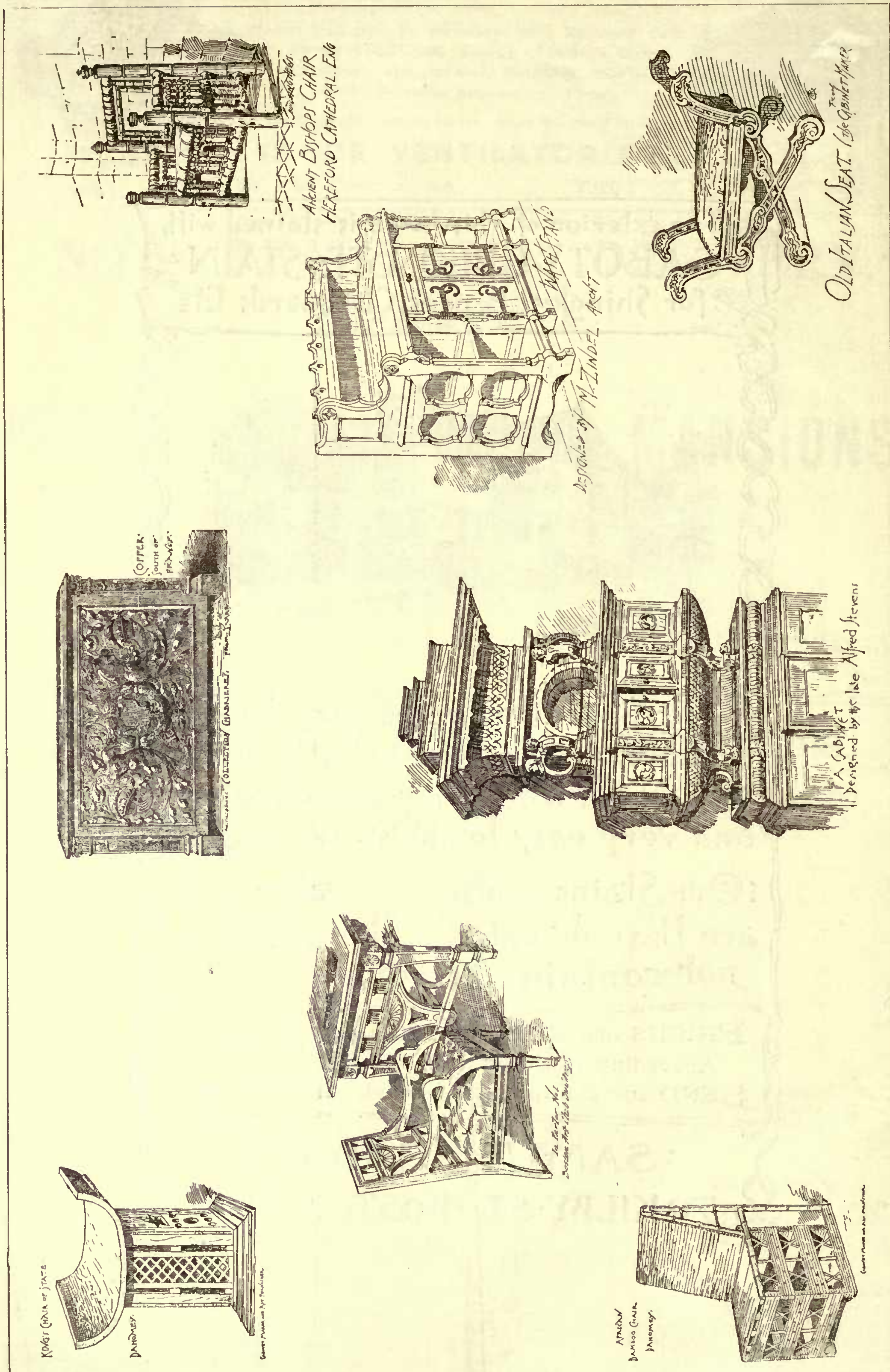
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CHAIRS AND CABINETS.

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WE commend to the attention of the members of the new American Institute of Architects the example of the French Société Centrale des Architectes, which annually awards to its members and others medals for particularly good work in various departments of professional practice. The medals are awarded at the annual Congress, but the names of those selected for the honor are announced some time previously. This year three "Grand Silver Medals" are to be presented for excellence in domestic architecture, one of which is to go to M. Fevrier, of Paris, the second, *ex æquo*, to M. Pellechet, also of Paris, while the third is awarded to M. Dainville, of Angers. For Jurisprudence, a silver medal has been assigned to M. Aldrophe, of Paris, and one in Archæology, to M. Fournereau, of Paris. Many other medals are presented to students, stone-carvers, decorators and so on, which we should hardly need to trouble ourselves with at present, but it would be easy to raise among us money enough for an annual silver, or even gold, medal, to be awarded for domestic architecture, which would be eagerly sought by the members of the new society, and would be a valuable possession for any of them. It would probably be best to restrict the prize to excellence in domestic architecture, for the reason that it would be easier to make a fair comparison of houses than of public buildings, in which the requirements, as well as the scale, the cost and other circumstances, vary so much that a proper comparison would be hardly possible. The award might perhaps be made in the Russian manner, by the members present at the Convention, each person marking, on some scale of points, all the designs, as shown by photographs and plans, except his own; and we will answer for it that the process of making the award would be one of the most interesting portions of the Convention's proceedings. As to the medal itself, which might be made a splendid affair, at a very small cost to the members of the society, there would be no doubt that it would be liberally shown by the happy recipient to his friends, rather to the advantage of the new Institute, which has few opportunities for making its existence known to the great body of mankind. Unlike many professional trophies, the Institute's medal would be a certificate of professional ability which would admit of no criticism or questioning, and as such would be the most precious possession of any one who owned it, while the fact that such a reward was to be gained would stimulate many an ambitious architect to exertions which there is now no inducement to make. Every one will agree that we need some way of encouraging architects to do their best in their work. The only persons whom they have to please at present are their clients, who are much more easily charmed by clever sketching than by solid study of plan and detail, if indeed, they do not expressly demand a bastard "colonial," or some other fashionable mannerism of design, to the exclusion of both originality and taste. Upon a jury of architects, on the contrary, the sort of claptrap which passes with clients for genius would be thrown away, and while those who aspired to the prize would help themselves greatly by the honest and well-directed efforts which they must make to win it, the award of the prizes, by showing the public the sort of work which the experts in the art considered best, would be a powerful influence in promoting a better and more intelligent taste in architecture than is now to be found. In the city of Brussels, as our readers know, the municipality itself gives every year a prize for the most beautiful house erected in the town during the year, and however the award may be made, we may be sure that the prize house is an object, not only of pride to its owner and architect, but of much curiosity to the citizens. It is probably too much to expect that any of our cities will, for a long time to come, offer prizes for anything so unpractical as a work of art of any sort, but the collective body of architects can offer it at once, and thus do something to hasten the arrival of the time when the appreciation of art shall be as familiar to the Americans as it was to the ancient Athenians. We must not forget that no people ever carried the principle and habit of competition so far as the Greeks, and we can hardly doubt that it was the most powerful element in their unrivalled intellectual development, if not in their physical superiority, and while we cannot hope to interest as many persons in our Olympic games as in those of the base-ball players and oarsmen, the annual struggle for the olive-crown would at least do us much good, and in time would attract the attention of many persons outside our ranks. This is by no means the first time that the matter has been spoken of, and more than one committee of the old Institute, if we are not mistaken, has urged the foundation of such prizes, but nothing has yet come of the recommendation, and we hope that the new body may take up the question with energy.

A CORRESPONDENT sends us some rudely lithographed circulars, which were distributed to architects by a school-committee in a Western city. The school-committee, in its first circular, invited architects to furnish in competition, within a space of about two weeks, "full working-drawings, details and specifications" for a "twelve-room school-house to cost not more than forty thousand dollars," and promised to pay one thousand dollars for the "plan adopted." A little information as to site was appended, but nearly everything else which an architect would need to know, in order to make plans intelligently, was left out. In consequence of this, apparently, the committee was besieged with questions from intending competitors, and sent forth a second circular, containing answers to the more important questions, for the benefit of all the competitors alike. From the circular of answers it appeared that the committee did not really want full drawings and specifications, but that sketches might be sent in, and the successful plan might subsequently be "detailed and specified," it being understood that this should be done before the thousand dollars was paid. It further appeared that the committee had no idea what sort of heating and ventilating system, or drainage, it would adopt. It was considering the Smead and other systems, and when it determined what to select, the plans of the building could be modified to suit. There were several other items of instruction, but these were perhaps the most important, and our correspondent, with reason, invites our attention to the ignorant, unfair and ridiculous way in which the whole matter had been so far treated.

AS usual in such cases, while we fully sympathize with the disgust of architects who see a sum offered for plans for so important a public building as a twelve-room school-house, which would not pay for anything like the skill and thought required to design it properly, and who see, still further, the invitation issued in such a form as to impose, as it seems to them wantonly, an immense amount of labor on the conscientious men, which, as a second circular showed, would not have been required of the astute individuals who had the ear

of the committee, we are convinced that ignorance, not intentional malice or fraudulent purpose, was here to blame. That the committee really desired to act fairly by all the competitors is, to our mind, shown by its distribution of the second circular, containing its answers to the questions which had been asked, and the miserable failure of the whole affair in everything that makes a competition of any value seems to be due simply to the fact that the committee had no idea of what constitutes a modern school-house, or of what architects' work consists in, and that it was either too ignorant of these matters to know that it knew nothing about them, or too conceited to ask advice from any one who knew more than it did. In consequence of this, which is, we are compelled to say, the habitual condition of American school-committees, we will venture to predict, that after having inspired some of its fellow-citizens with the idea that it meditated a contemptible fraud, and put several others to useless trouble and expense, and exposed the public treasury to a considerable number of suits for damages, it will wind up its operations by bequeathing to the next generation another of those ill-planned, ill-ventilated, ugly, unwholesome and costly specimens of school architecture in which we condemn our children to lose their health, their eyesight, and often their modesty, to the amazement of foreigners, who cannot conceive of such a practice as leaving the destinies of the young to the hap-hazard direction which disgraces this country. To the just complaints which our children would make, if they had the necessary knowledge, against the nonchalant ignorance and carelessness to which the formation of their physical character is entrusted, we hope to give expression at some future time; but no champion ought to be needed to regulate the relation of architects with such committees. The poor, uncomplaining children must sit, day after day, in the stench of the rooms "ventilated" by one patent process, heated to roasting by another, or supplied with ice-cold currents around their feet by a third, compelled thereto by the fear of the truant-officer; but no truant-officer compels architects to enter competitions whose terms they do not like, and if they will only have the courage to say in advance, publicly and unanimously, what terms they will demand, they are sure to get them. In the rare instances where, as in this case, a committee publicly advertises one set of terms, and subsequently agrees, either privately or publicly, to different conditions, it is unquestionably liable for damages to all persons who have done any work in accordance with the stipulations which it first proposed, and if there are any architects in the town in question who made detail drawings and specifications for the school-house, in accordance with the first invitation, before the second circular was issued, they can probably collect, either from the town or from the individual members of the committee, a fair compensation for their wasted trouble. It is true that it would be likely to cost as much to collect the money as the amount of the verdict, but we must bear in mind that some time. in the autumn, we believe, now, we are to have a reorganized Institute of Architects, which looks forward to being able at some future time to take up such cases and push them to a verdict, in the interest of the profession, and without expense to the individual architects concerned.

THE project for a World's Fair in 1892, to celebrate the discovery of America by Columbus, is getting a good deal of discussion, partly from the fact that the New York papers think that it ought to be held in that city, instead of in Washington, as was first proposed. There are, of course, advantages in having such an affair held in the largest city in the country, but the experience of ten years ago, when abortive attempts were made to arrange for something of the same kind in New York, is not encouraging. Already, a dispute has been started over the question whether the Central Park shall be used to put the necessary buildings on, and the conflict of interests and prejudices, which proved fatal to the scheme of 1880, seems likely to make it impossible to arrange for holding the fair in New York, even if it were, on the whole, desirable to do so. Concerning the impropriety of ruining the Central Park merely for the sake of securing an inexpensive site for a six months' fair, there can hardly be two opinions among people outside of the city. There are many other available sites, the best, perhaps, being the Port Morris tract, which was generally conceded to be the best one proposed for the previous exhibition, and is said to be still available. This is accessible by sea or land, and has deep water at its edge, so that foreign products could be landed on the fair grounds from the ship in which they were imported. As every one seems to have a different suggestion to make, we will add ours, which is, that under the conditions which are expected to obtain in 1892, there might be a worse place for an affair of the kind than Staten Island. It has been several times proposed to extend the New Jersey Central Railway across the narrow "Kills" to the island, and all the other railways which terminate in Jersey City could use the same tracks to carry passengers across. As for passengers from the North and East, we must remember that the Hudson River tunnel is expected to be done by that time, and people who wanted to be transported directly to the fair grounds could be taken through it and over the bridge; while for passengers by water the shore of the island affords innumerable landing-places, so that a line of ferry-boats might start from the foot of every street in New York, on either river, and convey visitors to the exhibition grounds. As a site, independent of questions of accessibility, Staten Island could hardly be surpassed, and there would probably be an unlimited amount of unoccupied land available.

THE body of young Mr. Westell, whose accidental death by drowning we announced last week, has been recovered, and is to be taken to England under the care of his partner, Mr. Mellen, and of his friend Mr. Wills, who was with him at the time of his death, and narrowly escaped sharing his fate. Mr. Westell has a father, mother and sister in England. The New York papers led us astray by saying that he was an Associate R. I. B. A., and a holder of the Pugin Scholarship. We regret that we endorsed these statements since nothing would have been more repugnant to Mr. Westell than anything that looked like sailing under false colors. Short as his life here was, it was long enough for him to gain reputation and friends, and his family in England will have much sympathy from this side of the ocean in their great loss.

BOSTON enjoys the distinction of having been the only American city which has contributed any substantial sum to the work of the Egypt Exploration Fund, and it is to receive its reward in the shape of a remarkable collection of Egyptian antiquities and curiosities. It would be a suggestive question for lovers of such matters, to inquire whether the Way collection of Egyptian curiosities, which has been shown in the Boston Art Museum for several years, may not have served to excite an interest in the subject, which has shown itself in the support given to the more recent investigations, but, however that may be, Boston has sent about six thousand dollars to be spent in digging in Egypt, and is now reaping its reward. Among the objects more recently discovered, which are to be transmitted to Boston, is an enormous lotus-bud capital, from the hypostyle hall of the temple at Bubastis, in two pieces, each measuring twelve or fourteen feet in length, and five in thickness; the upper half of a colossal statue of a king, in red granite, which seems, from the accounts, to date from about 4000 B. C.; a huge capital, with a head of Hathor, measuring six feet in length, and several other pieces of sculpture. All these are to be kept in the Museum of Fine Arts, where they will, we hope, be studied as they deserve.

A RATHER exciting archæological discovery is reported from Hungary. About a hundred years ago, an immense treasure of silver and gold was dug up near the mountains of Transylvania, in the wildest and least-known part of Hungary. It is a matter of history that Attila, "the Scourge of God," after plundering nearly all Europe, and a large part of Asia, was buried, with a large amount of his precious booty, in some part of Hungary, but tradition relates that he desired to keep the place of his interment secret, and that the work was done by prisoners, who were all killed as soon as they returned from their task. However that may be, it seems certain that no place has ever been assigned as Attila's grave, and the discovery of the valuable objects constituting what is now called "Attila's Treasure," seems to have been the first clue to the discovery of a secret which had been kept successfully for nearly fourteen hundred years. A few weeks ago, some excavations in the same place brought to light a fresh collection of vases, dishes and other objects, nearly all of solid gold, and of the most beautiful antique workmanship, the whole being valued at about four hundred thousand dollars.

EQUESTRIAN MONUMENTS.[1] — XVIII.

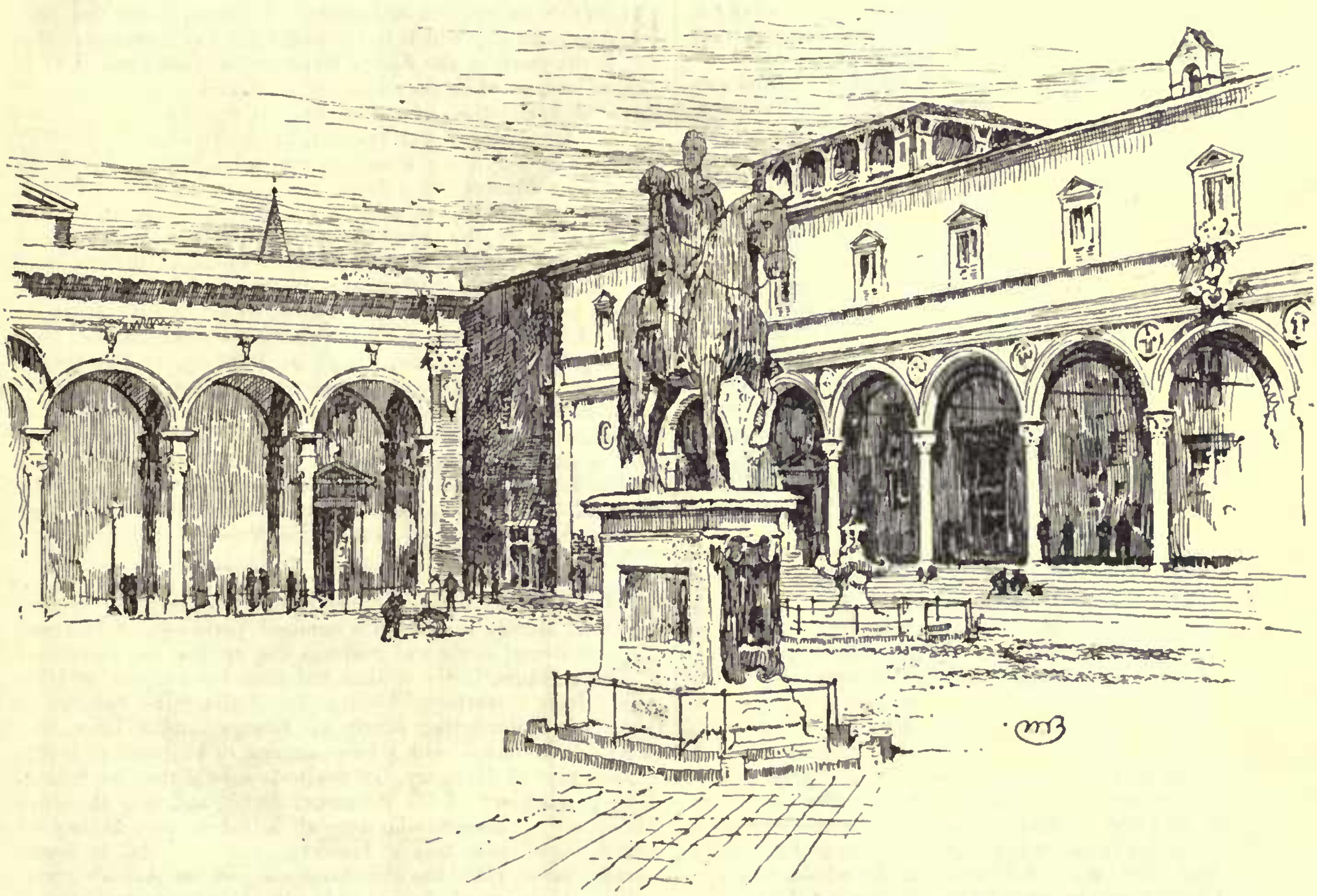


Seal of the Dauphin, Humbert II.

OF all the great names of Italy during the Renaissance period none is better known than that of the Medici, who, from being generally known as merchant princes and often slightingly spoken of for having the audacity to mate at times with princes *de pur sang*, are often considered to belong to the ungentle class of self-made men. As a fact the family was, though not noble, an ancient one, and had always taken leading parts in the affairs of the Florentine republic, and more than one member had character enough to give an enduring name to howsoever humble a family. Michael Angelo perhaps did something to perpetuate the fame of Lorenzo the Magnificent and his unfortunate brother Giuliano, by creating the famous tombs in San Lorenzo with their well-known unfinished figures. The skill of another famous sculptor also added lasting qualities to the name of a later member of the Medici family, Cosmo, first Grand Duke of Tuscany, and named after Cosmo the Great, who was practically the founder of the family's power, as his descendant was founder of its dynastic character.

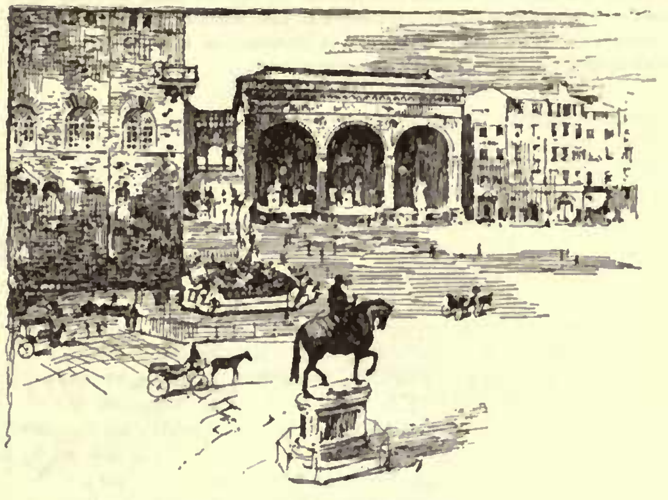
John of Bologna has rather given the lie to history by the noble portrait statue he has left of a man who holds rank amongst the tyrants of Italy.

> "Among those awful forms in elder time
> Assembled, and through many after age
> Destined to stand as Genii of the place
> Where men most meet in Florence, may be seen
> His who first played the Tyrant. Clad in mail
> But with his helmet off — in kingly state
> Aloft he sits upon his horse of brass."
>
> — *Samuel Rogers.*



Ferdinand de' Medici, Florence.

This rather benign-looking middle-aged man, whose face indicates firmness of character but not brutality, does not look like one who would keep a paid band of assassins to help in the execution of his schemes of ambition, and one is tempted to believe that the Belgian sculptor was a bit of a courtier. The portraiture is, however, of so vital a character that the original of the statue may have been one of those controlled natures whose body is wholly subject to the will, and the alleged habitual Italian duplicity may have enabled him to give his ordinary facial expression a benignity that belied his intentions. After all, Cosmo was not a tyrant of the worst type. The history of the statue, which stands in the Piazza della Signoria, the most popular quarter of Florence, is somewhat peculiar. It was at one time determined to erect in this piazza an elaborate fountain, and, though a young man, John of Bologna had hopes that the task



The Piazza della Signoria, Florence.

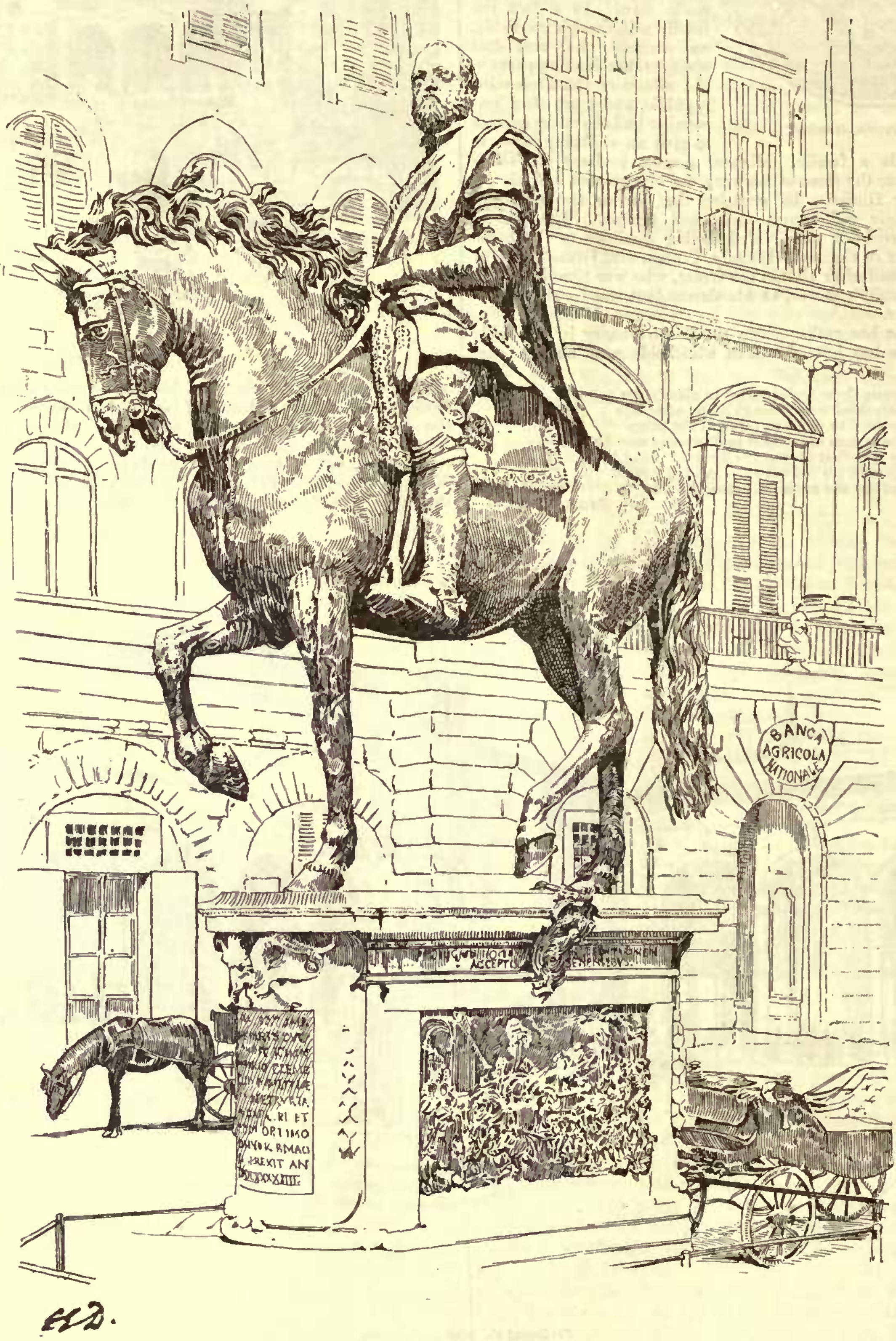
would be entrusted to him; but his powers were distrusted and the work was placed in the hands of Bartolomeo Ammanti, who executed the fountain of Neptune that still stands there. Piqued by this failure the young sculptor at a later day made a rendering of the same subject, which survives in the shape of the famous Fountain of Neptune before the Palazzo del Podestà at Bologna. But to take the edge off his failure to secure the Florentine fountain, the task of creating an equestrian statue of Cosmo was at once placed in his hands. It would seem, though, that of the two problems much the most difficult one had been entrusted to the younger man. Very likely there may have been something frivolous in the character of the times when a fountain outranked an equestrian statue in the scale of importance.

John of Bologna threw himself into his task and labored long —

[1] Continued from No. 704, page 299.

from 1587 to 1594 — and earnestly, and when at length the statue was completed he had the boardings removed and hid himself behind them to catch the first criticisms that passers might utter. Apparently the verdict was favorable, for the only change that he was led to make was to add on the innerside of the horse's forearm those peculiar horn-like protuberances, the evidence of some function suppressed through evolutionary process.

The horse shows the influence on the sculptor of his study of the few equestrian statues that were then accessible, notably the horse of Marcus Aurelius at Rome, but it can hardly be held to rank with the rider as a piece of art, and were it not for the position in which it stands and the sculptor's fame, it is doubtful if the group would rank above the mass of mediocre statues.



Cosmo de' Medici, Florence.

But having succeeded once it was quite natural that the sculptor should, at a later day, have been entrusted with the making of an equestrian statue of another member of the Medici family, Ferdinand I, a younger son of Cosmo, who finally succeeded to the dukedom.

About this statue there is a pretty bit of romance which Browning partly tells in this way;

"There's a palace in Florence, the world knows well,
And a statue watches it from the square,
And this story of both do our townsmen tell."

. . . .

"The Duke had sighed like the simplest wretch
In Florence. 'Youth — my dream escapes!
'Will its record stay?' and he bade them fetch

"Some subtle moulder of brazen shapes —
'Can the soul, the will, die out of a man
'Ere his body finds the grave that gapes?

"'John of Douay shall effect my plan,
'Set me on horseback here aloft,
'Alive, as the crafty sculptor can,

"'In the very square I have crossed so oft:
'That men may admire, when future suns
'Shall touch the eyes to a purpose soft,

"'While the mouth and the brow stay brave in bronze—
'Admire and say, "When he was alive
"How he would take his pleasure once!"

"'And it shall go hard but I contrive
'To listen the while, and laugh in my tomb
'At idleness which aspires to strive.'"
—From Browning's "*The Statue and the Bust.*"

Trained as an ecclesiastic, as was then the common lot of younger brothers, perhaps Ferdinand was too cautious to take the risk or



Philip III, Medrid. From *Zeitschrift für Bildende Kunst.*

lacked the promptitude needful to enable him to possess himself of the beautiful wife of one of his nobles whom he had learned to love through seeing her at a window as he rode by, and therefore dallied



Philip IV, Medrid. From *Zeitschrift für Bildende Kunst.*

so long with his mute passion that the chance was lost, and the lady died. And in commemoration of this platonic episode he caused the statue to be erected with the face upturned to the familiar window above which was placed a bust of the lamented dear one looking kindly down on her too timid lover.

The statue, cast from cannon taken from the Turks by the Knights of St. Stephen, stands in the Piazza della S. Annunziata at Florence, opposite the Foundling Hospital. The statue was ordered in 1601 and the horse was successfully cast in 1603 and the figure of the rider two years later which, considering that the sculptor was an octogenarian, was most expeditious work. He did not, however, live to see it set on its pedestal, which was done five months after his death. The merit, as in the earlier statue, here lies in the portraiture of the rider.



Charles Emmanuel of Savoy, in the Lowenbarg, Cassel. From *Zeitschrift für Bildende Kunst.*

Besides these statues, John of Bologna, as has been stated, was engaged by Marie de' Medici to make the statue of Henri IV, but only succeeded in his advanced age in modelling the horse, and in the time between he modelled an equestrian statue of Philip III of Spain, now at Madrid, which Ferdinand de' Medici desired to present to that monarch just as he intended to present a statue of Henry IV to Marie his widowed cousin.

John of Bologna was the fashion just then. As the photographic camera was an undiscovered apparatus, the skill of the painter was sometimes called on to furnish a sculptor at a distance, in another country in this case, with the needed data for his task, and like other Spanish monarchs Philip III was much given to having his portrait painted. Juan Pantoja de la Cruz was painter in ordinary to the king and naturally he it was who was chosen to paint the portrait of the king which was to be sent to Florence



Bronze Statuette in the Bargello, Florence. From *Zeitschrift für Bildende Kunst.*

to John of Bologna as a guide. The Spanish painter was required, in 1604, to paint the king on horseback and so may have suggested the pose adopted for the statue, in much the same way that the wooden

model of the statue of Henri IV by Francavilla, sent out from Paris to the same sculptor was followed as the foundation of the Italian master's idea. As in the case of the Paris monument so in this, John did not live to complete his task, but left it to the care of the same pupil, Pietro Tacca. The statue was taken to Spain in 1616 and set up in the Garden of La Casa del Campo, near Madrid, where it remained till in 1848 it was transferred to the capital. During one of the late uprisings, known as the period of the Red Republic, it was pulled down by a mob [in 1873] but fortunately not destroyed, so that it was afterward stored in hiding and was at the restoration re-erected in the Plaza Mayor.

The same method of procuring a statue was adopted by the succeeding Spanish monarch, Philip IV, but as John of Bologna had passed away and Pietro Tacca had found favor in his place it was Tacca who had to be furnished with data for modelling an equestrian statue of the king who, whatever other merits he may have had, was famed as the most perfect horseman in all Spain. This fact probably suggested that so noble a horseman should be shown controlling his steed and maintaining seat and equanimity undisturbed by any unusual or violent movement, and accordingly the horse is shown rearing and plunging forward as few bronze horses do. To support a horse and rider of such size — and the group weighs 18,000 pounds — was no easy task, the solution of which is commonly ascribed to Galileo, who probably suggested that by making the castings of the horse's head, legs and shoulders thinner than those of the hinder parts, the centre of gravity could be brought nearly enough over the line of support offered by the hind legs to allow the solid weight of an extraordinarily large and heavy tail to act as counterpoise. The feat once accomplished, practically the same thing has been done with many more recent statues — at Paris, St. Petersburg, Dresden, Lima, Edinburgh and elsewhere — in various stages of agitated erection, some of which are balanced while others are partly supported by the tail which is made to sweep the ground.

Velazquez was the painter selected to make the portrait of Philip IV, which was to serve the sculptor as a model, and the ease with which a painter can pose his figures on canvas without having to take thought for how his poses can be carried out by those other artists who have constantly to keep in mind the laws of gravitation and those which govern strains is not unlikely the reason why a sculptor should have selected so difficult an attitude. It is easy to see, though, how a sculptor might consider that such a picture as Velazquez furnished was nothing more than a challenge which an artist in one kind offered to a rival in a kindred art, and so to the rivalry of race was added a determination to prove that metal could follow the lead of the more facile brush. As this painting by Velazquez has recently been identified in the Uffizi, it should be easy to determine what foundation of truth there is in this supposition. The painting itself was not, or not alone, sent to Tacca, it was placed first in the hand of a Spanish sculptor, Montanes, who carved, as it is understood, a full-sized model of the group in wood which was sent to Tacca at Florence. To whom then should be really credited the merit of this unusual and in many ways excellent piece of work, it is not easy to say, but it seems certain that the names of all three men should be kept associated with the work.



Philip IV, Madrid, Spain.

When the statue, which weighs about nine tons, is nineteen feet high and cost 40,000 ducats, was sent to Spain in 1640, it was set up in the secluded Buen Retiro Garden and so was comparatively little known. Early in this century, however, it was suggested that the statue should be taken from retirement and brought to Madrid where more people could see it. But the minister, Gramaldi — probably a connection of the famous Genoese family of that name and not connected, unless possibly a certain crack-brainedness is proof of consanguinity, with the famous clown who for forty years delighted lovers of pantomime in London — roundly declared he would consent to the removal only if the statue were transmogrified by substituting the head of the Bourbon, Charles III, for that of Philip, as he protested that it would be too great an honor for any mere Austrian to be translated to Madrid. Nevertheless the statue, unmutilated, was brought to Madrid in 1844 and now stands in the Plaza del Oriente.

Until within three years this statue was supposed to be probably the first that had been modelled in such an audacious attitude, and to Velazquez has been attributed the pose here carried out, but the investigations of Karl Justi have discovered that the pose was one which Tacca had employed twenty years earlier.

In the Löwenberg castle, near Cassel, is a bronze statuette, seventy-five centimetres high, which until 1803 was carried on the catalogue as a statuette of Victor Amadeus of Savoy, by Pietro Tacca. At that time evidence derived from the figure itself, paintings and busts, satisfied experts that it really represented Charles Emmanuel of Savoy (1580 – 1630), one of the most warlike and successful princes of his time. This point decided, documentary evidence was easily discovered which finally made the history of the group clear and establishes the fact that the Philip IV is not the earliest rearing equestrian composition. About half-way through his long reign Charles Emmanuel conceived the idea that himself and his career were deserving of enduring commemoration, so he summoned Tacca from Florence, and in 1619 ordered him to model a colossal equestrian group to be erected at Turin. Tacca made a model accordingly, which was warmly approved and he was instructed to carry it out at large scale. On his return to Florence the difficulties attending the transportation of so great a mass of metal appeared to him to be so nearly insurmountable that he notified the duke that his wishes could not be carried out. But to mitigate the disappointment he was going to inflict he completed his model and made a bronze casting which he finished most carefully by hand and carried it himself to Turin. The duke not only swallowed his chagrin but rewarded the sculptor most munificently and at a later day took the trouble to write him a letter saying how highly he valued the little manikin.

In the same collection at the Löwenberg is another bronze statuette by Tacca, of Albert of Austria, the brother-in-law of Charles Emmanuel, he also having married a daughter of Philip II; in this case the horse does not run but walks. The statuette at the Löwenberg is very similar to one, also by Tacca, in the Bargello at Florence, we might say two, were it not that the second shows only an unmounted rearing horse. These statuettes have been usually considered as studies for the Philip IV, but it is now believed that they were really studies for a statuette of Louis XIII which Tacca, who also practised the goldsmith's art, executed in gold. The fate of this piece of work which was sent by some one as a gift to the French king, is not known. All of these rearing statues must give way in point of age to the rearing mule ridden by Pietro Farnese, which formerly stood in the Cathedral at Florence and possibly furnished the inspiration which Tacca, a Florentine, worked out in these several instances.

From John of Bologna to John of Bologna's pupils is, as seen above, a natural progression and as Tacca was not the only pupil who assisted the master on his later equestrian statues so there are other pupils who profited by their training to make names for themselves. Amongst these was Francesco Mocchi, who executed two very commonplace equestrian statues that stand in Piacenza in the Piazza dei Cavelli at either side of the famous Palazzo Communale, one erected in 1620 in honor of Ranuccio Farnese and the other in 1624 to his more illustrious father, Alessandro Farnese, Prince of Parma, and lieutenant under and successor to the Don John of Austria so famous in the Spanish wars in the Netherlands.

It is rather pitiful that so great a captain as Alessandro Farnese, should in this wise be so belittled, and a character of martial grandeur treated in so ineffective a way, although the ridiculous flowing robes of the later pseudo-classic style make a more agreeable composition than is effected in the case of his son Ranuccio who is clad in Roman armor. Fortunately the greater interest of the Palazzo Communale, in front of which they stand, makes their demerits inconspicuous.

COSMO I [or Cosimo I,] the son of Giovanni delle Bande Nere, was born in 1519, and succeeded Alessandro de' Medici as head of the Florentine Republic in 1537. His election was opposed by a number of citizens who had been exiled from Florence by the acts of Duke Alessandro, and, under the leadership of Bernado Salviati and Piero Strozzi, their forces marched against Cosimo. But Vitelli, who commanded the latter's army, met them at Montemurio and inflicted upon them a signal defeat. Cosmo behaved with great severity towards the unfortunate prisoners, and many of them, including Filippo Strozzi, father of Piero, were either executed or assassinated. Cosmo, though so young, plainly showed that "he was a man of stern resolve, who went straight to his end without scruples or half measures." Punishing with death all who dared to resist his will, the number of executions during his reign amounted to 146, exclusive of those who died by the hands of his assassins. "He reduced the old republican institutions to empty forms, decreed not only the confiscation of the property of exiles, but likewise that of their heirs, even if personally acquired by the latter," and burdened the people with enormous taxes. He besieged Siena, which was defended by Piero Strozzi, for fifteen months, and finally caused its capitulation on honorable terms, which Cosmo afterwards shamefully violated. On the succession of Philip II to the Spanish throne, Cosmo obtained Siena and Pontoferra, and in 1559 captured Montalcino, thus forming the grand duchy of Tuscany, over which he ruled to his death, in 1574, at the age of 54. Although a tyrant, and in many ways a villain, he ruled his State with great capacity, judgment and firmness, and did not neglect many useful measures for its prosperity.

FERDINAND I.—Ferdinand, son of Cosmo I, was born in 1549, and succeeded his brother, Francesco I, in 1587. Though a cardinal from the age of fourteen, he had never taken holy orders, but he retained the cardinal's purple until the time of his marriage. He showed much tact and experience in the management of ecclesiastical affairs, was affable in manners and generous in purse, instantly pardoned all who had opposed him, re-established the administration of justice, favored commerce, and sedulously attended to the business of the State and the welfare of his subjects, carrying out many important public works. He greatly increased the Tuscan navy, which did itself much honor on the Mediterranean, especially at the capture of Bona, the headquarters of the Corsairs, and by a great victory over the Turks, won in the Archipelago in 1608. Ferdinand founded the Villa Medici at Rome, and purchased many priceless works of art, such as the Niobe group, for Florence. He died in 1609.

PHILIP III, a son of Philip II and Anne of Austria, was born in Madrid in 1578, and began to reign in 1598. Timid, indolent and incapable, he was yet as intolerant as his father. His time was chiefly passed in hunting and in acts of devotion, or in the formalities of etiquette, and the affairs of the government were left to the direction of his favorite, the Duke of Lermo. During the reign of Philip III, the independence of the Seven United Provinces of the Netherlands was recognized, and (in 1610) the Moors were expelled from Spain. Philip died in 1621.

JUAN PANTOJA DE LA CRUZ.—Born at Madrid in 1551, and was a scholar of Alfonso Sanchez Coello. Philip II named him one of his painters and valets-de-chambre and he became very eminent both as an historical and portrait painter. He painted a great number of portraits of the family of Philip II, and at his death, continued in favor with his successor, Philip III. Pantoja died at Madrid in 1609.

PHILIP IV, a son of Philip III, was born in 1605, and ascended the throne at the age of sixteen. He submitted himself to the control of his favorite, the Duke of Olivarez. In 1621, at the expiration of the truce of twelve years, made in 1609 with the Dutch United Provinces, Philip renewed the war with them, and formed a league against the Protestants with the Emperor of Germany. His intrigues involved Europe in a long and disastrous war, in which Spain was opposed by Holland, Sweden, France and England. In 1640 Portugal revolted and was finally separated from the Spanish monarchy. By the treaty of Westphalia (1648) peace was made, except between Spain and France, the latter nation continuing the war until 1659. Philip was twice married, his first wife being Elizabeth of France and his second, Marie Anne of Austria. He died in 1665.

D. GERONIMO, MARQUIS DE GRIMALDI, a Spanish diplomat of Italian origin, was born at Genoa in 1720, and died in 1786. He was made minister of foreign affairs by Charles III of Spain.

CHARLES EMMANUEL I, Duke of Savoy, surnamed the Great, born in 1562, succeeded his father, Philibert-Emanuel, in 1580. He married Catherine, daughter of Philip II of Spain. He was ambitious and warlike, and waged a long war against Henry IV of France. Died in 1630.

RANUCCIO FARNESE.—Born in 1569. Succeeded his father, Alessandro, in 1592. Gloomy, suspicious, covetous and merciless, one of the first acts of his reign was to burn nine women accused of witchcraft. He lived in constant dread of the vengeance of the nobility, whom he insulted and oppressed. A supposed conspiracy enabled him, in 1612, to glut his ire upon them. Seven members of the principal families, among whom was the Countess of Colorno, one of the most beautiful women of her day, were beheaded in front of the windows of his palace. Ranuccio died in 1622.

ALESSANDRO FARNESE, Duke of Parma.—Born in 1546. Grandson of Charles V and of Pope Paul III, and a nephew of Don John of Austria. He greatly distinguished himself under the last-named prince at the battle of Lepanto. He came into the Netherlands, the scene of his chief military renown, in 1578, in which year Don John died, and was succeeded in his command by Farnese. His most famous exploits in the Low Countries, where he was almost invariably victorious, were the taking of Maestricht, after an eight months' siege, and the capture of Antwerp, which only fell subsequent to a siege of over a year. In 1588 he was put in command of the Armada, but, being shut up in Antwerp by the Dutch fleet, could, luckily for him, take no active part in the expedition. He outgeneralled Henry IV of Navarre on two occasions, at the siege of Paris in 1591, and at Rouen in 1592. In this Normandy campaign he received a wound at the siege of Caudebec, which finally caused his death, at Arras, the same year. Farnese was one of the greatest captains of any time, and may be considered as undoubtedly the most able general whom Spain in her palmiest days sent forth to conquer. His moral character also merits admiration, in view of his age and birth, and the fact that he was the instrument of his sovereign, Philip II.

DON JOHN OF AUSTRIA, was the natural son of the Emperor Charles V and a German woman. He was born at Ratisbon in 1546, and was educated by Quixada, a Spanish nobleman. Charles V on his death-bed recommended him to the protection of Philip II, who soon after acknowledged Don John as his brother. At the age of twenty-two, he was appointed commander-in-chief of the forces sent against the Moors of Granada, whom he overcame in several battles and entirely subdued. In 1571, war having been declared between Philip II and the Sultan, Don John was made generalissimo of the combined fleets of Spain and Italy. Sailing from Messina in the middle of September with 250 ships of war and about 50,000 men, he encountered the Turkish fleet in the Gulf of Lepanto on October 7, and gained one of the greatest naval victories recorded. In an expedition against Africa, he took Tunis, Biserta and other places. In 1575 he was appointed Governor of the Netherlands, then in a rebellious condition. At first conciliatory measures were used, but the States mistrusted him, declined his overtures and prepared for war. Soon after he took Namur by stratagem, and in 1578 won the decisive battle of Gemblours. He afterwards reduced Louvain, Nivelles and other insurgent towns. While thus engaged, he was taken ill and died in October, 1578.

[To be continued.]

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

ENTRANCE TO TEMPLE, NIKKO, JAPAN.

[Helio-chrome, issued only with the Imperial Edition.]

SAWSTON HALL, CAMBRIDGESHIRE; CREWE HALL, CHESHIRE; DORFOLD HALL, CHESHIRE; PLACE HOUSE, CORNWALL, ENGLAND.

[Issued only with the Imperial Edition.]

AGE OF FRANCIS I.—TOMB OF FRANCIS II, NANTES, FRANCE.

[Issued only with the Imperial Edition.]

CHAPEL OF THE GOOD SHEPHERD, BLACKWELL'S ISLAND, NEW YORK, N. Y. MR. FREDERICK C. WITHERS, ARCHITECT, NEW YORK, N. Y.

THIS building has just been erected by George Bliss, Esq., a well-known banker of New York, at a cost of about $75,000, for the use of the inmates of the Almshouse. The design embraces a chapel with seating-capacity for four hundred men and women, and below it a lecture or reading room; a study for the clergy in charge, and a room for the use of the ladies in connection with the City Mission Society of New York. Separate entrances are arranged, one for the men and the other for the women, each of which leads directly up an easy stairway of stone eight feet wide, into the church, and down by steps ten feet wide, to the reading-room below. The chapel consists of a nave eighty feet long by thirty-seven feet wide, and a chancel twenty-seven feet in width, and twenty-four feet deep, terminating in a semicircular apse with a stairway in the turret at the side, for access from the study or robing-room below. A fine organ occupies the chamber provided for it on the north side of the nave, and the font is placed under a recessed arch below the western gable, between the two entrances to the chapel. In the basement is a reading-room sixty-two feet by thirty-six feet, a ladies-room twenty-six feet by fourteen feet, and a robing-room or study twenty-six feet by twenty-two feet. The building is erected of native rock-faced granite, as high as the water-table, and above it the walls are faced with Croton front brick, with all the trimmings throughout of Belleville stone. The brick walls are built hollow, faced on the inside with brown enamelled brick as high as the stone string-course under the windows, and above it the whole of the interior walls are of buff-colored pressed-brick laid in red mortar. The chancel and other arches, doorways, window-hoods, etc., on the inside are trimmed with limestone. The roofs are open-timbered, constructed of Georgia pine and finished in panels with moulded ribs, etc. The benches are open, of quartered oak, and floors of Georgia pine in chapel, and of oak in chancel. The windows of the nave are filled with ornamental glass in colored mosaic pattern, and those of the chancel with figures of Our Lord as the Good Shepherd, and the four Evangelists. The tower contains a fine toned bell, and the chancel is fitted up with altar and reredos, sedilia, stalls, etc., all of oak and neatly carved, brass eagle lectern, and oak pulpit, screen, etc. The contract for the whole of the work was taken by Philip Herrman's Son.

THE PALAZZO COMMUNALE AND THE STATUE OF ALESSANDRO FARNESE, PIACENZA, ITALY.

SEE article on "Equestrian Monuments," elsewhere in this issue.

STATUES OF ALESSANDRO AND RANUCCIO FARNESE, PIACENZA, ITALY.

SEE article on "Equestrian Monuments," elsewhere in this issue. These illustrations are reproduced from Litta's "*Famiglie Celebri Italiane.*"

THE PIAZZA DEL ORIENTE AND THE STATUE OF PHILIP IV, MADRID, SPAIN.

SEE article on "Equestrian Monuments," elsewhere in this issue.

THIRD NATIONAL BANK BUILDING, CINCINNATI, O. MR. H. E. SITER, ARCHITECT, CINCINNATI, O.

PAVILION FOR HIGH PARK.—PAVILION AND BAND-STAND FOR QUEEN'S PARK, MONTREAL, CAN. MESSRS. KNOX & ELLIOT, ARCHITECTS, MONTREAL, CAN.

SAFE BUILDING.[1] — XXIX.

VOL. II. — II.



FROM pig-iron is produced cast-iron, steel and wrought-iron.

Manufacture of Cast-iron. Castings are generally made from pig-iron. In some rare cases cheap castings are made the same as the pig-iron, from the "first melting," that is, directly from the molten ore. Most castings, however, are made from the second melting, that is, the pig-iron is re-melted in a cupola or reverbatory furnace with more flux to take up any remaining impurities, and the molten mass run out into the moulds. The second melting makes of course very much better work. **Moulds, flask and core.** The moulds generally consist of a wooden flask or box, made in parts which are secured together by clamps, the parts generally being halves, top cope and bottom. This flask is filled all around the *inside* with a lining of a special dampened black or green (fascia) sand; into this sand the mould or pattern of the outside of the casting is pressed and, after ramming the sand, removed, leaving, of course, the impression of the outside of casting. The core is then secured into position in the flask. The core is the reverse of the mould being sometimes a sand pattern covered on the *outside* with a similar rammed sand made to fit the hollow spaces on the inside of the castings, and stiffened with an iron piece called the "arbor," but usually made of a baked mixture of sand and clay or flour, which forms a friable, infusible mass, which can be easily broken up and removed after the casting has cooled. The top flask is then secured over the whole, and the molten metal is run in through convenient holes left through the flask, until all the space between the core and mould is filled with metal. The gases generated escape through holes left in the cope, and from the core by putting iron rods along the arbor which are withdrawn before casting. The whole is then covered with sand and allowed to cool slowly if of varying thickness; if the casting is long and thin it is "stripped" of the moulding sand to prevent warping. The inside of the mould is frequently painted with coal dust or charred oak, or dusted with flour of plumbago, which generates hot gases that prevent the too quick chilling of the external surfaces of the casting by the dampened sand and makes a clearer surface finish. When cold the top flask is lifted off, the arbor withdrawn and the finished casting removed from the bottom flask. The casting is then chipped off and finished. Small and cheap castings, such as separators, are revolved in a rumble (a sort of barrel) for the finishing process. **Economical Castings.** It will be seen, therefore, that the most economical castings will be those which are so designed that the pattern can be easily withdrawn and the flask readily made in simple parts; in which case it is only necessary to line the flask with a fresh layer of sand for each casting. Whenever possible, castings should be made in an upright position (the metal being, of course, run in from the top), as the long core, if horizontal, being unsupported except at its ends is apt to sag in the centre, or float with the metal, making uneven thicknesses in the casting above and below the core. To avoid this the core should be supported by small iron "chaplets," which mix and combine with the casting. There is also danger of slag and other impurities that may be carried into the mould floating to one side. In upright castings or where there are large vents they will float off on top.[2] To discover whether the casting is or is not uneven, the architect should have every column or long hollow casting "tapped" **Inspection by Tapping.** at about midway of its length. Tapping consists of drilling a hole, about three-eighths of an inch diameter through the shell. A small wire with the end bent at right angles is inserted in the hole; the bent part is drawn closely to the inside of shell and the outside of shell marked on the wire, which on being withdrawn gives the exact thickness of shell. In case of rectangular or round castings there should be four such holes bored, two opposite each other and the other two the same, but at right angles to the line of the first two. All of course in the same plane, and about midway of the length of casting.

The amount of metal in the shell is then readily ascertained, also whether the casting is of even thickness.

For a good strong casting it is very essential that all parts should **Even thickness best.** be designed (and cast) of even thickness. Castings of uneven thickness vary greatly in strength for two reasons. For some reason not thoroughly understood, though generally attributed to the influence of the gases produced in the flask, the outside layers or "skin" of castings is supposed to be very much stronger than any other part. The metal on the inside seems to diminish in strength the farther it lies from the outside. (Experiments as to whether the skin does or does not add strength, however, are contradictory, the latest seeming to disprove the theory of its extra strength.)

It is found, however, by actual experiment that castings from the **Thin castings strongest.** same metal, made at the same time, vary according to their thickness in strength, the thinnest being the strongest in proportion to their metal, and the thickest the weakest.

Another serious objection to uneven thickness in castings is the uneven cooling; that is, the thin parts cool before the thicker ones, and the consequence is the production of internal strains in the metal, the parts which have cooled rapidly, contracting and pulling away from the other parts. This means tension, and a constant tension right in the metal and before any external strains come upon it; this frequently is the cause of the sudden and otherwise inexplicable failure of the casting.

It is essential, therefore, that not only should cast-iron cool evenly, **Danger of Sudden Cooling.** but also as slowly as possible, to allow the contracting parts to relax.[3] It is well-known that if a casting — column or lintel for instance — be heated in a fire and then suddenly be cooled by a stream of water played against it, that it is liable and likely to snap in two from the sudden tension put on the metal in rapid cooling. For this reason all such castings should be surrounded with non-conducting, fireproof materials wherever placed in inflammable buildings, or surrounded by inflammable goods.

Another essential in good castings is, not to have them too big and **Big castings bad.** heavy; otherwise it is impossible to keep the entire mass of same fluidity; that is, to prevent parts from cooling before other parts have yet been filled with molten metal. The result of such castings is apt to be weak from internal strains, due to unequal casting and cooling, to be weak on account of the thickness of the metal, and to be spongy or filled with air bubbles, due to the gases escaping at one end and mixing with the molten metal running in at the other end. Sand-holes in castings are, of course, due to the use of a poor quality of sand or improper ramming or to the presence of dirt, scum or other impurities.

Another essential in good castings is to round all angles, that is, **Avoid all sharp angles.** not to go abruptly from one surface to another at a right or sharp angle to the first: this, for the same reason that uneven thickness is avoided, namely, the danger of internal tensional strains.

In casting plates it is desirable to have a large circular hole, if possible, in the centre of the plate, or else several holes, which will largely prevent the great strain, in cooling, on the centre of the mass.

The contraction of cast-iron in cooling, from its bulk when fluid **Shrinkage in Castings.** depends on its thickness and its mixture. It is about $\frac{1}{8}''$ per foot for thin castings, for castings $1\frac{1}{2}''$ thick about $\frac{1}{12}''$ per foot, and for castings $2''$ thick about $\frac{1}{16}''$ per foot. The moulds and patterns are, therefore, made correspondingly larger than required by the architect's drawings.

All that has been said of iron-castings applies equally to steel- **Steel-castings.** castings. But as these are made at a temperature some 700° to 800° F. higher than for cast-iron, the contraction is, of course, much greater, and also the danger from unequal shrinkage. To avoid this, steel-castings are usually annealed, that is, left for some 24 hours in a furnace at 1700° F. — (the melting point being about 3500° F.) — and are then allowed to cool slowly.

In the manufacture of rolled or wrought iron the pig-iron forms **Manufacture of Wrought-iron.** the basis, but is sometimes first refined, though in many of the grades the refining is omitted. This refining consists in the conversion of the carbon contained in the pig-iron from the graphitic to the combined state. This is done by breaking the pig-iron into convenient lengths for handling and melting the iron and adding to it different substances to attract and remove the earthy impurities. To reduce the carbon the most usual process is the forcing of strong currents of air through tuyères downwards onto the melted mass, which stirs it up and uniting with the carbon, forms a carbonic oxide gas and ignites and burns part of the carbon away. The melted mass is run out into shallow metal troughs, and cooled suddenly by streams of cold water. The object of this sudden cooling, is to make white iron, that is, to prevent the remaining carbon from separating itself and resuming the graphitic form.

The refined (or pig) iron is next puddled; this consists sometimes, **Refining and Puddling.** but rarely, in remelting the iron, being the third melting, adding flux to attract the impurities, they and the flux being run off as iron slag; but usually in puddling the iron while it is still in pasty form, immediately after the removal of the carbon in the second melting or refining process. The pure iron forming a pasty mass is collected into separate lumps called puddle

[1] Continued from page 287, No. 703.

[2] On the muzzle end of cannons are cast heavy "sink heads," which contain the greater part of all impurities, leaving the good solid material for the guns proper. In heavy castings a flow or pathway is provided, more metal is poured than needed, and as it flows off it carries with it the dirt and impurities.

[3] When castings of unequal thicknesses are required, as for instance in fly-wheels and pulleys, the strains from unequal shrinkage are prevented by so removing the sand from the hot casting as to have all parts cool together. The thin parts or arms being kept covered until the heavier rim and hub have been hurried in cooling by uncovering them.

From puddle ball to muck bar. balls or loups, by the puddler, who stirs the mass around with his puddling bar, thus gradually forming the balls. When the puddle ball is of sufficient size, usually weighing from one to six hundred pounds, the puddler draws it out of the fire, and throws it on a wheelbarrow or truck; it is now run as quickly as possible to a steam hammer, where it is thoroughly pounded and thus welded into wrought-iron; or in more modern mills it is put into a rotary (Burden) squeezer which consists of a corrugated pinion and iron collar, situated one within the other, but eccentrically; the pinion revolving inside the collar, which is stationary, the puddle ball going in at the wide end, is kept constantly revolving by the corrugations, and at the same time is squeezed and drawn through and reduced between the pinion and collar, finally emerging at the other (narrow) end in cylindrical shape, and in nature partially rolled-iron, the slag and gases being squeezed out. From here it is taken while still heated, and several times run through between a pair of rollers which revolve in opposite directions under great pressure; these rollers have grooves along their surfaces, the largest at one end and diminishing gradually towards the other, thus gradually shaping the mass as desired into "muck bars," which are pieces of partially rolled-iron of convenient size and shape for handling, usually from 3 inches to 6 inches wide and ½ inch to ¾ inch thick in section. The length of each bar, of course, depends upon the weight of puddle ball.

LOUIS DECOPPET BERG.

[To be continued.]

VENETIAN GLASS.[1]



IN accepting the invitation of the Committee of the Applied Art Section to read a paper on the manufacture of Venetian glass before this Society, I fear I may have undertaken too great a responsibility. It is a subject which, from its ancient and historical treatment, may suffer at my hands. I can only say I will do my best, and should the subject be inadequately presented by me, I shall beg your indulgence for all shortcomings.

I need not mention here the tradition of the first discovery of glass; we have all read of the Phœnician dealers in soda, who, while taking refreshment on the banks of a river, noticed with great astonishment that the amalgamation (produced by the action of their fire) of soda with sand and the herb alkali, had produced a transparent substance, which was afterwards purified and otherwise improved till it was converted into glass. How far this tradition may be true this is not the place to discuss, for I must confine myself to that specialty which is known as Venetian glass.

You are doubtless aware that Venetian glass is not actually manufactered in Venice proper, but at Murano. Venice being the most important and best known city, has always lent her name to the art.

Murano is the prosaic name of an island built on the north of Venice, from which it is distant about half a mile. It is said that the name was derived from the Latin words, *murus muralis*, but I believe the name has a more local derivation. The island being washed by a northwest current of the Adriatic sea, which by its ebb and flow continually removes the otherwise stagnant water of the lagoon, I think that the true derivation of its name is from *maris, amnis*, which means "river of the sea," and in the subsequent changes of the language became Murano.

Is said that the reason Murano was chosen as the seat of the art of glass-blowing was on account of its peculiar geological position, which has no rival in Europe, and is only partially equalled by Reichenau in Bohemia.

The bed of the sea which washes the shore of Murano is composed in great part of quartz or silica, materials which are brought thence from the Alps in torrents. These materials or sand form one of the principal ingredients needful for the manufacture of Venetian glass. I may mention that some time ago the Minister of Public Works, on the request of the Chamber of Commerce of Venice, prohibited the use of this sand for any other purpose, and also prohibited its exportation.

There must be something peculiar in the natural position of Murano, as is proved by the fact that when the demand for the glass increased almost beyond the capabilities of the restricted space at command, the Muranese did not think it advisable to extend their furnaces and works to the neighboring islands. Not only is this restriction attributable to the natural position of Murano, but also to the personal peculiarities, in some measure, of the artists themselves.

They commenced their works naturally with the simplest forms used in daily life; afterwards, when they found a demand for something richer, more elaborate and complicated in design, they worked on step by step in their profession, discarding all use of moulds and contrivances for making easier and quicker their labors, intent only on perfecting their art works, and making every piece a real work of art, of which they are and always were extremely proud. So much do they identify themselves with their works, that there are certain forms and designs which are quite traditional. These have been handed down for generations from father to son, and are known by the family name of the artist producing them.

It would seem from the variety and immense numbers of tints and shades, that a knowledge of chemistry would be needed in the formation of the base of this manufacture. Such, however, is not the case as a reflection on the ignorance of this science 200 or 300 years ago will prove. This was about the time when Murano began to be renowned for her splendid productions, a renown which has been more or less maintained until the present day.

The artists had neither the time, nor the means, nor desire, to occupy themselves in chemical studies; but continual experiments and practice on certain traditional lines, together with patience and determination to succeed, are and have been the chief moving powers in their works.

Some time ago a celebrated professor of chemistry while questioning an old artist as to the manner in which he learned to make such an enormous variety of tints, asked him by what means he had arrived at such knowledge. The old artist told him that the grammer which he studied, and which was the key to all his success, was practice, and that he would defy the professor, with all his scientific skill, to produce the same color as he had just then produced. He added that the Muranese artists were like the birds, who could sing without having learned music.

For certain compositions there are naturally secrets, which are kept with scrupulous care, and handed down from father to son either by example or by simple writings.

Owing to the extremely good feeling which has always existed between Murano and the city of Venice, the former was specially favored, and received many honors from the "Queen of the Adriatic." In the year 1223, the doge and senators gave instructions that the names of the principal *maestri*, or heads of the glass-blowers, should be entered in the public records as being the names of persons to be held in high esteem and respected in the history of the republic. The senators and the Council of Ten established laws for the protection of the glass manufacture.

At the period of the Renaissance the works at Murano had reached such a point of perfection as to eclipse, by the originality and beauty of their productions, all the works in glass made by the Egyptians, Etruscans, and Romans.

The artists of this age were invited to and received at all the courts of Europe, and their works were universally proclaimed as exhibiting the inspiration of genius, and as doing the greatest honor to the industrial arts.

The Venetian government at this time was well aware of the immense moral and financial advantage which this manufacture brought to the country, and consequently took every precaution to prevent the secret of the manufacture from being learnt by foreigners, and the Murano workmen were absolutely forbidden to carry their skill beyond the boundries of the island of Murano. Artists who were by any means seduced from their allegiance. and persuaded to accept employment in other parts of Europe, were visited with severe punishment, and in some cases by actual death, while the State rewarded those who, by special skill or otherwise, distinguished themselves, and who remained faithful to their country, the senate even granting them the privilege of electing a chancellor to administer justice at Murano. The Venetian nobility also did not think it derogatory to their position to marry their children with the children of the Muranese *maestri*, and the children born of these marriages retained all the privileges of the nobility.

But even to Murano this age of glory and prosperity was not to be perpetual. By-and-by the "Queen of the Adriatic" declined, and the sunset of her political and industrial day caused the decadence also of her cherished and beloved neighbor, the island of Murano. In the 17th century the artistic perception of form and color was lost, and it was distressing to compare the heavy, shapeless, highly-colored objects then made with the exquisite colors and graceful designs of past years. The darkness of night had succeeded to the light of sunny days, which appeared to be gone forever.

The republic made several efforts to arrest this decay, by loading the artists with gifts and by granting them many privileges, also by imposing heavy taxes on the importation of foreign glass. Still the French and Bohemian glass had taken a strong position, and the continual purchase by Venetians of these wares contributed to the dying out of what until then remained of the production of art in Murano.

In the year 1700, when the art of glass-blowing was at its lowest ebb, Giuseppe Briasi made efforts to give new life to it, and being possessed of an indomitable will and great perseverance, he endeavored to restore the ancient beauty of form and color, by producing some fine specimens of chandeliers and candelabra and vases, in which could be seen some remnant of the past glory, but the prevailing taste of the period only served to injure instead of improving his efforts. His efforts were followed by others, viz., Bigaglia, Seguso, Barbini and Mialti; but all suffered the same fate, and their labors were rendered futile by the prevailing taste of the time, and their labors resembled the last dying flicker of a candle previous to its entire extinction.

At last the republic died, and the art of glass-blowing at Murano,

[1] A paper read by Dr. Giulio Salviati, before the Society of Arts and printed in the *Journal* of the Society.

which had hitherto been guarded and protected by Venice, fell into lethargy, but it was not really dead or even entirely forgotten. The elements of its existence and prosperity were not entirely dependent on political changes; and its traditions were bound up in the souls of the old artists of Murano, descending to their sons and grandsons, and it only required a fresh impulse to dispel the torpor and gloom in which it was sunk.

It was the pleasant duty of my father, Dr. Salviati, to give this first impulse and to raise the dormant genius, and give new life and energy to this lovely and brilliant art, with what success we all know. My father was a lawyer of good repute, and while exercising his professional duties at the Venetian forum, he spent his leisure hours in admiring and studying the sublime works left by his ancient compatriots. It grieved him that such lovely works should be doomed to oblivion, and in the year 1856 he conceived the arduous idea of reviving the mosaic art, and resuscitating it from the tomb of the past. He read and studied all books relating to the manufacture of gold and colored enamel, and having associated himself with Lorenzo Radi, of Murano (an artisan who for many years had occupied himself in studying the manufacture of the first material necessary for mosaic), he relinquished his profession of the law and dedicated all his energies and fortune to the development and perfection of the gold and silver and colored enamels for the manufacture of Venetian mosaic.

Their first joint attempts were so successful as to deserve the highest encomiums from the Royal Academy of Fine Arts in Venice. A committee, consisting of painters, sculptors and architects, was chosen from members of the Academy, to carefully inspect, examine and report upon the enamel produced by my father. After carefully examining, they declared that "the gold, silver and colored enamels produced by Dr. Salviati are even superior to the enamels of ancient times." It is not within the scope of this paper to give a history of the revival of mosaic by Dr. Salviati, nor a *résumé* of the various failures and successes by which the result was obtained, only to say, that this discovery of the means of making the enamels was the first step in the revival of the art of glass-blowing at Murano, as it was whilst so occupied that Dr. Salviati was persuaded to attempt also the restoration to Venice of this lost art. He was much helped and encouraged in the enterprise by Mr. Norman Shaw, one of the chief ornaments of his profession as an architect, who was quick to perceive that my father possessed the needful element of perseverance for this revival. He was also ably helped and advised by the late Mr. E. W. Cooke, R. A., the late Sir Gilbert Scott, also by Messrs. Clayton and Bell and others, who saw in the revival of mosaic a hope that the glass industry might also live again.

My father never ceased to express how grateful he always felt to these gentlemen for their artistic advice and help to him, and for their very valuable councils and encouragements, which helped him to persevere and conquer the apparently insuperable difficulties in his path.

The composition of the first material needful for the manufacture of mosaic has many of the qualities necessary for the production of the Venetian glass composition, hence it was an almost certain conclusion for a man with the energy and determination of Dr. Salviati not to rest satisfied when the difficulties of mosaic were conquered until those of the glass were also surmounted. It was no easy task to train the glass-blowers, and to make them forget the clumsy and heavy productions to which their hands had become accustomed, and to resume the light and elegant forms of the past times when Venice showed so great a pride in her artists, especially when we consider such lessons had to be given and received before a burning furnace, and then, even when success crowned their efforts, there were many disappointments. I need not enumerate the numerous difficulties which had to be met and overcome before Dr. Salviati was in the proud position of being able to say, "Now again is Venice famous for her blown glass and mosaics."

The glass-blower of Murano is no mere mechanic or artisan, he is in every respect a true artist, an artist endowed with the perception of beauty and genius, who invents and creates daily new forms and colors. The glass is to him what the chisel is to the sculptor, the brush to the painter, and the works he produces are the offspring of his talent, and the perfection of form, delicacy of color and lightness, are his hobby, and when, after several arduous trials, he succeeds in producing a splendid specimen of his art, all the fatigue is forgotten in the legitimate pride and pleasure with which he looks upon it and says "This is mine."

Under the name of "Venetian glass" is comprised not only the elegant vases and goblets and ornamental objects, but also chandeliers, candelabra, mirrors, table-glass and roundels of sheet-glass for windows, etc., for which Venice was famous.

There are a number of names used to express the various kinds of glass, thus: The "ritorto," a kind of stripe of different colors on a plain ground; the "fiamma," a mixture of many different colors, so named from its appearance of flames; the "retticello," which represents delicate lace-patterns; the "aventurine," looking like brilliant gold; the "festoncino," having the appearance of threads; the "chalcedony," looking as its name signifies, like some stone or marble, etc. These various compositions all require different treatment, many needing several days in preparation.

The tools used by the artists are few and very simple, a hollow, long tube of iron for blowing, a large pair of shears for cutting (similar to those used by tailors), a few other instruments for measuring, and a stamp with a strawberry-shaped die, these compose all the instruments used in the production of all the articles, even in a *tour de force*, which is the term used to express the most complicated designs. The production of a vase or other article is obtained in this way: The end of the blowing-rod is dipped into a pot containing molten-glass, and a portion of it accumulated on the end. It is essential that the quantity which adheres to the rod should be accurately guessed for the size of the vase or other object which it is intended to produce, be it a small wine-glass or a large tazza. If the quantity taken up is too small, the article produced will not be of sufficient size, and naturally if too much is taken, the article produced will exceed the required dimensions. This lump of liquid-glass is then rolled on a table by giving a few turns to the blowing-rod; it is then blown by the artist slightly, then re-heated in the furnace. This process is repeated each time the article takes a more definite shape, until after repeated heating and blowing, the lump of glass is blown into a vase, cup or other article. During the whole operation the artist remains in front of the furnace, as the material must be kept in a liquid condition until the right form and size are obtained. Having thus made the body of the object, the artist now proceeds to form the foot or stand. In this he is assisted by another artist of an inferior grade, who has prepared meanwhile a piece of the necessary material on a blow-pipe, and who has blown it hollow. This he keeps in a liquid state, and in order to prevent it from dropping off his pipe he has to continually turn it round and round. The right moment must be watched, and then the two parts are joined; a twist, a pull and a little dexterous manipulation, and the stem is formed. The article is again placed in the furnace; meanwhile the maestro, or chief artist, takes up a small portion of another colored material, then, taking the article from the furnace, he proceeds to ornament it with strawberries, flowers, leaves or other devices; between each operation the article is introduced to the furnace to keep it soft; of course it has to be carefully held in shape. It is astounding to see the numerous variety of decorations which the artists produce for the embellishment of the objects. There are serpents, dragons, flowers, leaves, handles, etc., nothing is too complicated or simple, one and all are modelled by these instruments. Some vases require the attention of four artists at the same time, and require from one to two hours of uninterrupted labor. During this time they are placed in and out of the furnace thirty or forty times. While they are in the furnace they have to be kept in position by a special artisan called a "forcellante," whose duty it is to keep the article turned round and round, and who must watch that it does not drop or any way lose its form; for this purpose he uses a long fork-like instrument, this he has to do standing in front of the mouth of the furnace until the article is sufficiently cooled to retain its shape without assistance; then by slow degrees it is introduced further and further into the cooler part of the furnace where it remains cooling until the following morning. The painter and sculptor know how difficult their art is, and how much practice they must go through before they can draw a model accurately. How much more difficult, then, must it be for an artist to have to mould his subjects from the pliant and semi-liquid glass, and to be obliged to work at such a speed as to prevent the glass from cooling too much for manipulation.

This general process of blowing is applicable to self-colors, such as opal, ruby, acquamarina, etc.; but when the object to be produced is to be made of the richer and more complicated wares, such as the reticillo, ritorto, filagree, etc., then the material requires a separate preparation, which process (according to the material required) takes from one to three days. These are prepared in long strips called "canna," and when covered with crystal and ready are placed side by side on a kind of shovel, which is put into the furnace; as they melt they adhere to each other, and the workman with a piece of half-melted glass on the end of his rod presses on the ends, then with a dexterous twist he winds them all up into the form of a cylinder, the end of which is fixed to the handle that is to control them during subsequent operations. When thus ready, the artist dips the end of his blow-pipe, charged with the cylinder of prepared strips or canna, into a pot or ordinary clear glass, which is to protect the delicate lace work or the sensitive aventurina. He then proceeds to roll them on the marver or little iron table, and when by heating, rolling and blowing, they form a compact body, he proceeds to cut off a piece of the required size, taking care that the strips are all evenly joined. The vitreous mass thus obtained is then treated by the artist in a manner I have already described to you, and he proceeds to fashion his jug, vase, glass, tazza, or other object. The pattern which was thus imprisoned in the small strips is now by blowing fully developed.

If no twisted movement has been given during the operation, the lines of lace-work or other work remain straight; if, on the other hand, a different movement has been given during the process, the lines will have a twisted effect, as is often seen in Venetian glass. The filagree is prepared by minute thread-like strips enclosed between two sheets of crystal glass; the threads are sometimes crossed and then minute air-bubbles are imprisoned between the two sheets of glass, having a very beautiful effect when completed.

The "fiamma" is prepared thus: Upon a hollowed and rolled lump of material are laid strips of aventurina and other colors which are to form the "flames," which are wound spirally round; they are then heated, and whilst in the oven, and before the fusion has proceeded very far, a sharp edge piece of iron is drawn across them

several times, so that there are ridges both ways on the mass, which gradually amalgamates into one piece. On coming out of the fire, the object is subjected to extra twisting beyond that necessary to give it its proper form.

The "millefiore" is a lengthy process. First there are strips made of a certain pattern according to the taste of the artist; these strips are encased in clear glass cut up into lozenge-shaped pieces, then laid on a surface of any colored glass desired to form the groundwork of the contemplated article, the whole is then heated and blown, developing as it proceeds, the pattern contained in small lozenges on a clear or colored ground, producing a lovely effect. By this process all kinds of designs can be produced, animals, insects and even portraits, distributed all over the vase, jug or other form. A portrait is formed by the artist taking several strips or canna of the requisite tints, and putting them together in a similar way by which a mosaic protrait is made; this is, as may be imagined, a very delicate and difficult operation. When thus arranged they are covered with a thin coat of crystal, which serves the double purpose of keeping them in place and of preserving them; the mass thus prepared is then inserted into the furnace, and when it commences to melt, two artists, each having an iron tube with a piece of molten crystal on the end, take hold of the mass, one at each side, they move very quietly in opposite directions, which has the effect of elongating the round strip, which is stretched longer and longer until it presents a long, thin round strip, which has been kept firmly in place by the coating of clear glass, and which preserves perfectly the portrait all through. This strip of prepared canna is then cut into very thin lozenges and used the same way as in the previous preparation, being used to ornament plates, jugs, goblets, etc.

The aventurina is a metal preparation produced by the fusion of various component parts; this is a material used to give the exquisite brilliancy and lustre so much admired in Venetian glass; it is a very difficult and tedious process, and exceedingly uncertain in its results. This process is one of the chief secrets of Venetian glass, and is only known to one or two of the maestri. It is said the name "aventurina" is derived from adventure, on account of its always uncertain results. The use of a little more or less heat than is absolutely necessary, or some other cause (mostly inexplicable to the most experienced artist himself), will cause the whole mass to be a failure, after three or four days' labor. Instead of being the brilliant aventurina the artist expected, he finds on opening the oven a mass of composition of a dull brick-like color.

The aventurina is used not only in the glass-blowing, but also in the jewelry when it is cut and polished. When used in glass-blowing, a great amount of care must be exercised, and it must be protected by a covering of crystal, otherwise all the sparkling effect would be lost.

The fires used in blowing Venetian glass are made of wood, coal being useless on account of its generating too much smoke and gas, which prevent the delicate ornaments used in decorating the various objects from adhering. Ornaments and vases made by *coal* or *gas* alone would soon separate into their various parts.

The artists are from their entrance allowed a certain time daily for study, during which they design and create new shapes and colors. In this, of course, some are more skilful than others. They work together in the greatest possible harmony, each one aiding the other to develop and perfect any new idea, and the interest with which they all anxiously await the moment when a new shaped vase or a new combination of color is to be withdrawn from the oven is surprising. There seems no personal jealousy, every one is equally as interested, from the youngest boy to the oldest man. They perfectly understand the capabilities of each one among them, and when the vase or tazza, or other object is to be made, each artist immediately prepares for his individual part; thus, should the object required be of unusual dimensions, it is at once undertaken by those men who have the strongest lungs for blowing; again, should it be an exceptionally fragile and delicate vase, it is undertaken by the artists known to have the lightest hands; the most difficult forms such as griffins, dolphins, birds, etc., being the special work of certain artists only. I do not think it is easy to find such harmony as exists between artists employed at Murano. I can say that I never heard an angry word among them, and all mutually help one another; they are more happy when at work than when having holidays. These they are obliged to take during the end of July or August, when the furnaces are allowed to go out. The temperature being excessive, it is found impossible during this period for the men to work, so this opportunity is taken advantage of to build new furnaces.

There is one dreadful circumstance which they must all face, and this is blindness. It is unhappily the fact that nearly always, after many years of work, and when they are between forty and fifty years of age they begin to lose their sight, and after a little while they can see no longer. There is no means of preventing this; it is caused not only by the excessive heat, but also by the glare of the continual flames. Many things have been tried, and several kinds of protection for the eyes but without avail.

Fortunately, when the dreadful event occurs, they have not the additional suffering of want to face, for while at work their wages are very high, often surpassing those of their magistrate, and their mode of life is simple. They thus save large sums, and their declining years, if passed in darkness, are at any rate of ease and comfort in other respects.

I will now conclude my paper by simply stating that it is now over twenty-five years since this beautiful art of Venetian glass-blowing was revived by my father, and that it has continually progressed in form and colors, the always increasing demand for it, not only in this country, but in France, Germany, America, and indeed all parts of the globe where people are cultivated and appreciate works of art. Its cost, as you can understand, now that I have told you how each piece is made, is naturally greater than that of those glass articles which are moulded, but then its beauty is equivalent to its value.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE AMERICAN INSTITUTE OF ARCHITECTS.

NEW YORK, N. Y., July 13, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— I have just read the first three editorials in your issue of to-day.

Referring to the first one, let me say, as Secretary of the Institute, that no official decision has yet been arrived at as to the place of meeting of the joint Convention of the Western Association and the Institute, though Cincinnati was suggested. Also, that at a recent meeting of the Board of Trustees, held just after my return from abroad last month, the feeling was almost or quite unanimously expressed, *à propos* of a letter of inquiry from Mr. Patton, Secretary of the Western Association of Architects, that while it is not desirable until unification be accomplished to encourage fresh applications for admission to either organization, nevertheless (to quote from the minutes) "the Board of Trustees of the American Institute of Architects considers itself bound by its present By-laws concerning admission of members until consolidation is effected, lest some desirable applicant might be discouraged; and the Board is of opinion that similar careful admissions would be perfectly proper on the part of the Western Association of Architects." Ever since the Institute and its natural outcome and coadjutor, the Western Association of Architects, have been engaged on the inevitable desideratum of unification, I have — for the reasons implied in your leader, as for others — not exactly discouraged, but gone somewhat slowly with, candidates for the existing Institute, and, according to the circumstances of each case, referred them, either directly or by implication, to the approaching new conditions.

Referring to your second and third editorials, while I have good reason to know the very great diversity of opinion, alike among Eastern, Western and Southern members and candidates on the question of the proper place for the headquarters of the Institute when augmented and practicalized for the fulfilment over its whole field of the nearly perfect (if, at the same time, seemingly too ambitious) federalizing programme under which it was reorganized in 1867, I may say that personally (and you will please understand that on this point I am speaking without the slightest official authority), I have all along been in favor of the capital of the nation being the headquarters of the executive managers of the reorganized Institute. I presume it is to these always-employed directors you refer when you rightly insist that, in the interest of the whole organization, they must have permanent headquarters; for, as regards the Institute proper, that is, in its component parts, the Chapters (equivalent to the State associations of the present Western terminology), I have never seen any reason to change my old opinion that, as it has hitherto met and is intended to meet but once a year, it is not only entirely practicable to continue it as a "peripatetic body," but that it is for many reasons very much better, and is, indeed, almost indispensable to its maximum success, for some years, at least, to come, that it should be so.

The same reasons that make me personally prefer Washington as the headquarters, for current executive purposes, of the amplified and better endowed Institute (though I foresee very considerable drawbacks, as well as the advantages, which alone seem to strike you, in the frequent and close contact with congressmen) — some of these same reasons make me personally, also, prefer it as the place for the joint Convention at which the two organizations are to be fused together; and as you feel called on to say that "a strong effort will undoubtedly be made to keep the Institute offices in New York," and as I know that a strong effort has been and is being made to have the joint Convention held in a city naturally amenable to sectional influences, instead of in the single national, and, therefore, neutral city of the United States, you will, perhaps, allow me to quote a few lines on this point from a letter I wrote last April to Mr. Gibson, who so kindly and efficiently acted for me while I was recuperating abroad, to wit: "I sincerely hope that . . . the Convention [will be] held in the only national city — the 'Federal City' was its original name until Congress honored it with Washington's — which, from a four years' residence there [in an official position bringing me into responsible and constant relations with congressmen, the officials of the departments and society in general], I know to be really, as well as theoretically, independent — as regards national

questions, though there is plenty of local feeling as regards District [of Columbia] matters — of North, South, East or West; whereas no one can fairly deny that Cincinnati, though far east of San Francisco, or even of Omaha, is, nevertheless, a centre which would naturally attract an assemblage of distinctly Western prepossession."

The mere geographical question of centre of population or of membership in existing architectural brotherhoods has really almost nothing to do with the question of the proper locality for the impending Convention. The needful thing to do is to select where those attending from both organizations will be the most likely to find an environment wherein can best be preserved the balance between the equally important desiderata of fresh blood on the one hand and of experience and prestige on the other. And I am convinced that this environment exists more completely and that this balance can be better maintained in Washington than anywhere else.

Finally, as bearing upon the foregoing you will perhaps permit me to quote somewhat further from my letter just mentioned. I said: "What is needed now for success is not the uncovering of mares' nests, is not talk (however clever), is not the elaboration of preambles and resolutions which no one hears of again after the Secretary's time has been taken up in copying and distributing them, is not the appointment of committees which seldom meet but once and can accomplish nothing if they do meet oftener, is not disjointed and fruitless preliminary action in a dozen different bodies, each without prestige, numbers or means to turn its verbiage (however apposite) into anything available or practicable; but, on the other hand, what is wanted are, augmentation of members and consequent means of paying for the work that must be done, instead of draining it out of the strength, time, opportunities and personal resources of those who, it is only fair to suppose, need all these as much as others for their own individual purposes." . . . "Ridding themselves simultaneously of whatever Philistinism may exist in their own ranks, and concentrating their scattered forces, practitioners all over America would then stand with a single front, united and successful, against outside Philistinism; while divided as now, their various representative societies drag on a comparatively inert and inefficient existence, quite inadequate to their ambitious programmes, and to what, at least, ought to be the aim of all of them, as well as of the parent Institute, viz., the securing of the maximum 'efficiency of the profession,' which can only be secured by commanding for it its due rights, in the eyes of the public, as a homogeneous profession; and this, it is obvious, is not at all covered by the success, as individuals, here and there, of practising architects. Such success, though adequate talent and training at the outset can hardly fail to have been important factors in it, may be largely due to mere accident favoring the individual, and the frequent result of such success, viz., the establishment of large plan-factories (almost always, by the way, on the basis of our schedule terms and the authority of the Institute being duly quoted therefor), though doubtless very favorable for the personal interest of the practitioners administering them, is apt to be far from the best thing for the spread of good architecture in the community, or for the ultimate interests of the architects they employ as subordinates.

"To produce the best results for the public and for the mass of those aspiring to architectural practice, continued personal oversight and intervention in projecting one's artistic creations from paper into building material are by far the most conducive; and the true architectural practitioner's chief reward should be not in raking in as much money as possible — though that may be unobjectionable in one devoting himself to trade — but in the legitimate opportunity for embodying his creations in stone and timber. This, without immoderate self-sacrifice, can be realized only by his belonging, like a clergyman or lawyer, to a fraternity which, *per se*, commands the appreciation and respect of the community, and, through that appreciation and respect, simultaneously commands adequate no less than legitimate pecuniary returns for its services. And to produce this desiderated environment for the profession, wherein neither the occasion for, nor the temptation to, unworthy administrative methods would prominently present itself, nothing but associative harmony and coöperation will suffice." Yours very truly,

A. J. BLOOR.

NOTES AND CLIPPINGS

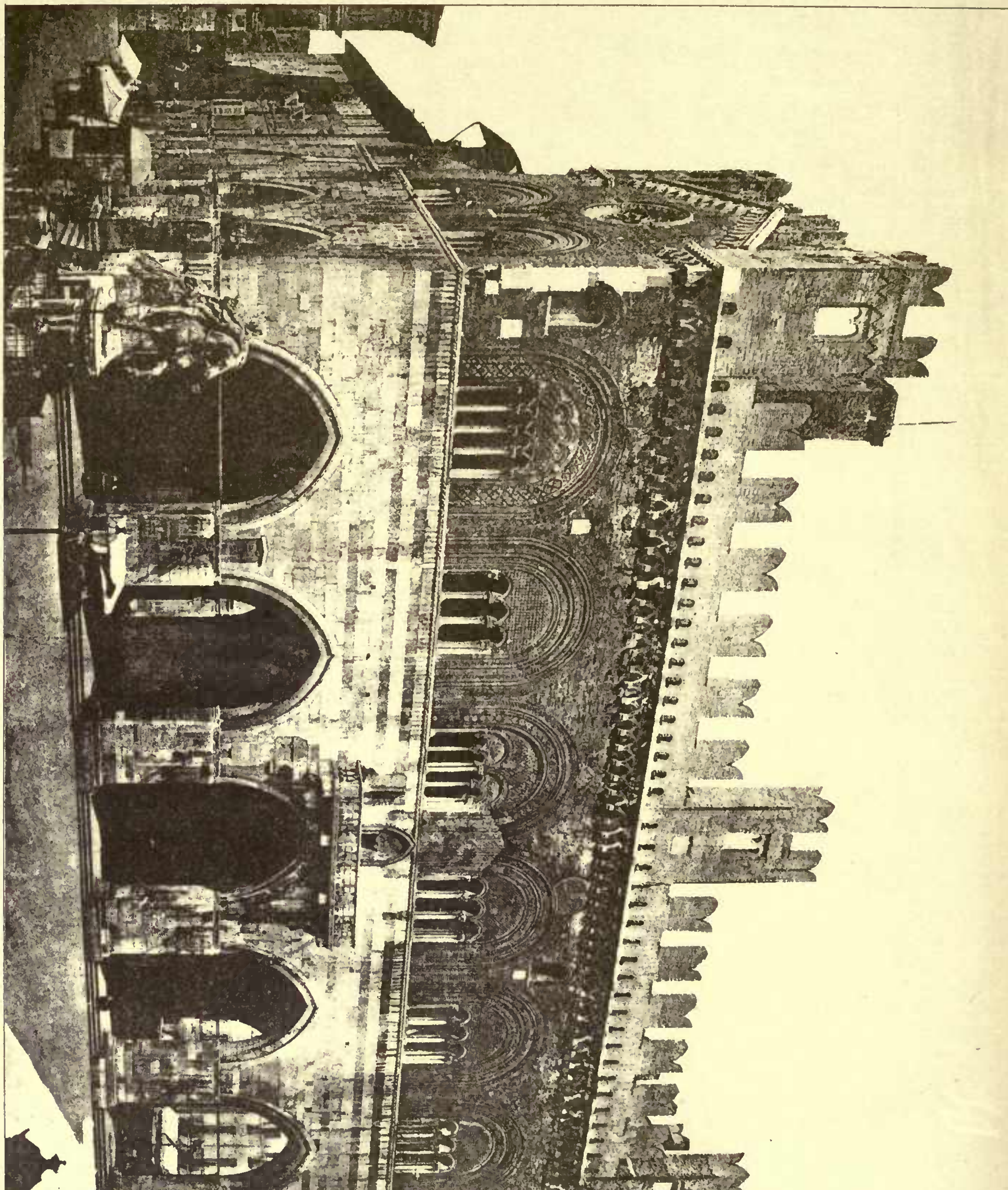
OVERTHROWING A HIGH CHIMNEY STACK. — The simple and successful method by which a high chimney was recently overthrown is described by an exchange. The stack was 100 feet high by ten feet square, and was on the Griswold Mills property, New Bedford, Mass. It was undermined by knocking out the bricks on the west and north sides, and shored up by planks placed in the apertures. These planks were liberally covered with tar and kerosene. When the time arrived for felling the chimney they were fired. As they became sufficiently burned to cease to support the chimney, the mass settled out of the perpendicular to the north and then cracked and fell with a crash to the ground. The bricks at the top were scattered over quite an area, while the iron coping was broken in quite a number of pieces. Along the length of the chimney to the height of sixty or seventy feet masses of brick for a length of two feet or more clung together and did not break up. — *Fire and Water.*

TRADE SURVEYS

IN thirty-five cities the outlay in buildings of all kinds, so far this year, is estimated at seventy million dollars more than up to this time last year. New York leads off with an increase of eighteen millions; Philadelphia with between four and five million dollars, and so on, clear to the Pacific coast, where in some parts, at least, something like a building boom is in progress. So far as information is available from the smaller cities and towns, the increase over last year is even more noticeable. The best corroborating evidence of the truth of these statements is the demand for lumber, nails, wire, hardware, wagons and farm implements and general merchandise. Enveloping all these is the still more important item of railway earnings. The earnings for June on 137 roads increased over June last year in the ratio from 4.48 per cent to 4.56, and for six months the gross earnings on 138 railroads show an increase of $12,472,598, an increase of over 6 per cent over the gross earnings of about the same mileage for the first half of last year. A few commercial facts might be briefly referred to, to show trade conditions: Since January 1, cotton receipts at Southern ports have been 1,534,701 bales, against 1,253,621 bales. Prices are better and export requirements good. The condition of Southern railroads as regards freight traffic is excellent. Gross and net earnings are slowly increasing. The Government wheat estimate is 490 million bushels; private estimates, 475 millions. Within a short time rumors have been rife of dangerous paralleling schemes between railroads, of which intimations were given in this column several weeks ago. The programme involves a crushing out and absorbing process. On the other hand, there are schemes under consideration looking to the formation of a series of railroad trusts. The railway managers are harassed and beset with annoyances, and do not see their way out. A vigorous effort will be quietly made at next session of Congress to sidetrack the Interstate Commerce Commission, but as determined friends have their tinkering material ready to strengthen it and stop up its leaks. The association is issuing its edicts as fast as brain power can work them out, but the troubles thus far have grown ahead of this high court's rapid work. General trade is good. The surplus reserve is dangerously low. The demand for money throughout the interior is very great. The multiplication of new industries, the extensive building operations, the expansion in the volume of commercial exchanges, all create a demand for money which is not altogether reassuring to those whose recollections extend back over twenty or thirty years of financial and commercial ups and downs. It is the fashion to glorify our monetary and banking system, and those who do not chime in are deficient somewhere, presumably; but our boasted monetary and banking systems need looking after. People are everywhere enlarging operations and taking on fresh responsibilities, trusting to future trade and dividends to meet quarter days. Eastern monetary institutions and private lenders are placing much money in high-interest latitudes, and so far with excellent results. This outflow can safely continue, for it is assisting in the opening up of new territory and the building up of new towns to be supplied with the shop, mill and foundry products of the East. The sea is smooth enough at present. The surplus of production above subsistence is large and all obligations are being promptly met, but an interruption, it must be kept always in mind, is possible.

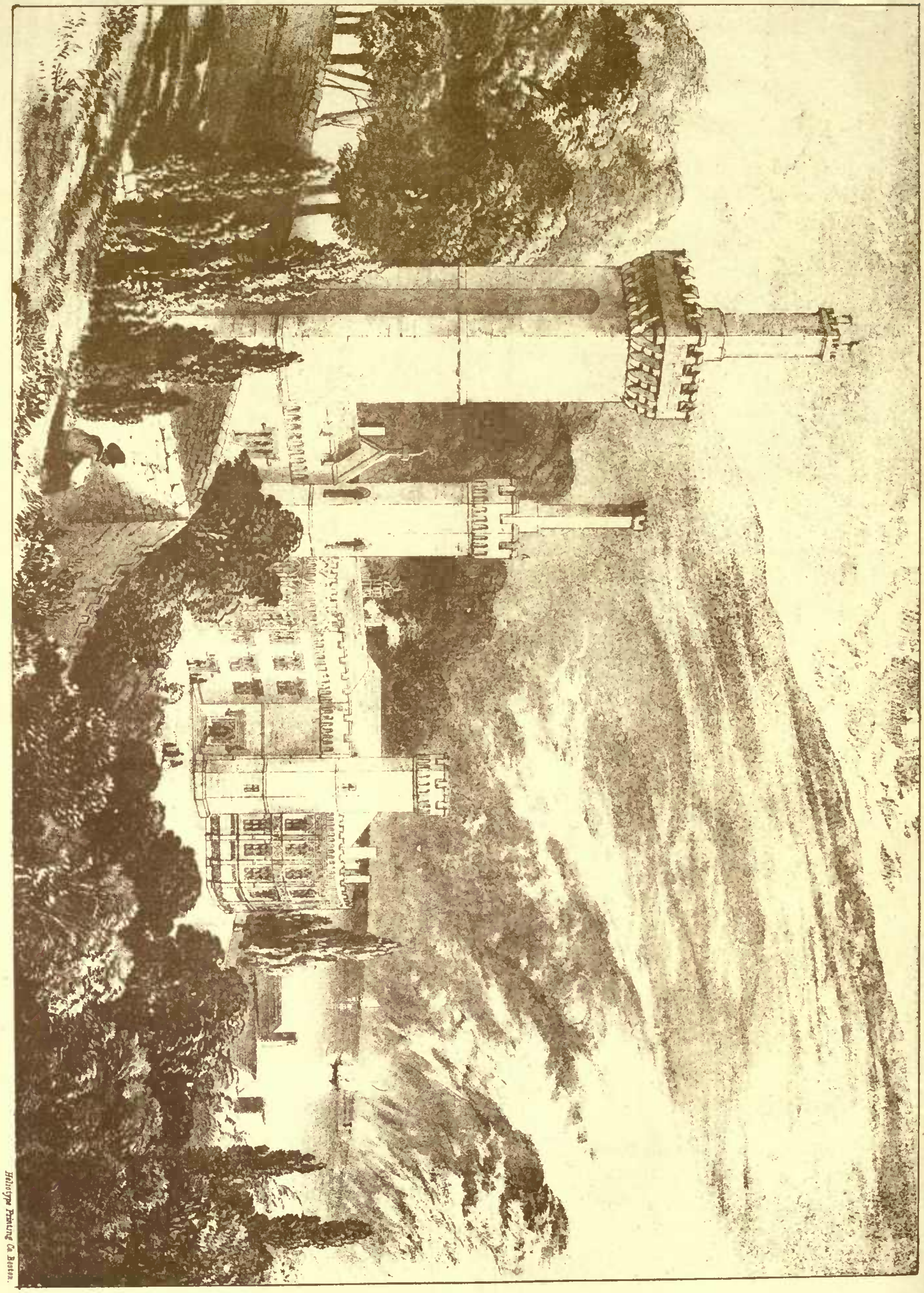
The present season of activity began in 1881 or 1882, and is now eight or nine years old. The channels of trade are pretty clear of accumulations, but productive capacity has been enormously increased. Fortunately, the bulk of this increased capacity is paid for. The productive energies of the nation are less in debt to the banks than perhaps ever in our history; that is to say, the indebtedness which can be suddenly turned into a sheriff's *fi fa.* Then, besides, the country has been rendered safer against unforeseen disasters through the very mediumship of agencies it is fashionable in many quarters to denounce; viz., trusts and syndicates. The power of these combinations will hold up and steady things. They will prove to be rallying centres. They do not need, and, perhaps, do not deserve, apologies for existence, but certain it is that their rise and expansion is based on certain necessities, in the creation or extinction of which the masses of the people, in their individual or legislative capacity, are powerless to act. Passing by general considerations and descending to particulars, we find the great industries all enjoying fair activity and moderate prices. There is no great stimulus to capital to rush into production. Its most favorite fields are land, mines, lumber and combinations for more economic production. Speculation is concerning itself with what incoming population will appreciate in value. Mining operations from coal to gold are paying, though, in Pennsylvania, the falling off in production this year is almost two million tons, as against the first half of last year. If this decreased demand had been permitted to legitimately react on prices, coal would have been at least fifty cents lower for anthracite, and twenty-five cents for bituminous. The lumber manufacturers repeat their chronic, but untrue, complaint of a dull business. More lumber, taking all regions into account, has been cut and used this year than ever. The new lumber regions of the South have contributed a great increase to Northern supplies. The export trade is improving year by year. The New England textile workers are anticipating some relief from past stringent conditions. Woolen manufacturers see a brighter pathway. Hosiery manufacturers repeat to trade reporters that there is no money in business, but increase capacity and floor-space. The New England industries, as a whole, have not fallen back, but, on the contrary, the additions of the past year prove that capitalists see more opportunities for reward than the much-talked-of South. Southern textile manufacturers, while doing well, are working in a field of restricted proportions, and already the alarm has been sounded, and the advice earnestly given, that preparations be made to produce a finer quality of goods. The same applies to the iron interests of Pennsylvania. Northern capital, pluck and enterprise are proving a match for Southern enterprise, but not without the slowly-coming good sense of railway managers, who at last perceive that it will not pay to let their golden eggs be broken in their greed to get all the traffic will bear. An industrial reorganization is quietly taking place. Establishments are moving to new places. New sources of fuel-supply are being opened up. Cost of production is, on the whole, declining. Capital is finding employment where, a few years ago, it would not venture, and the people are scattering all over the country and quietly laying the foundations of better conditions. Every year strengthens the interests of the people as against corporate and syndicate power, although the people do not know it. These high combinations have a good work to do, and, while doing it, they will naturally tread upon the interests, if not the rights, of the people, beyond whose reach they seek to establish themselves. But the day of reckoning will at last arrive, and what is good in these vast combinations will be preserved and strengthened, but under such intelligent control as will make them the best possible guardians of the public interests.

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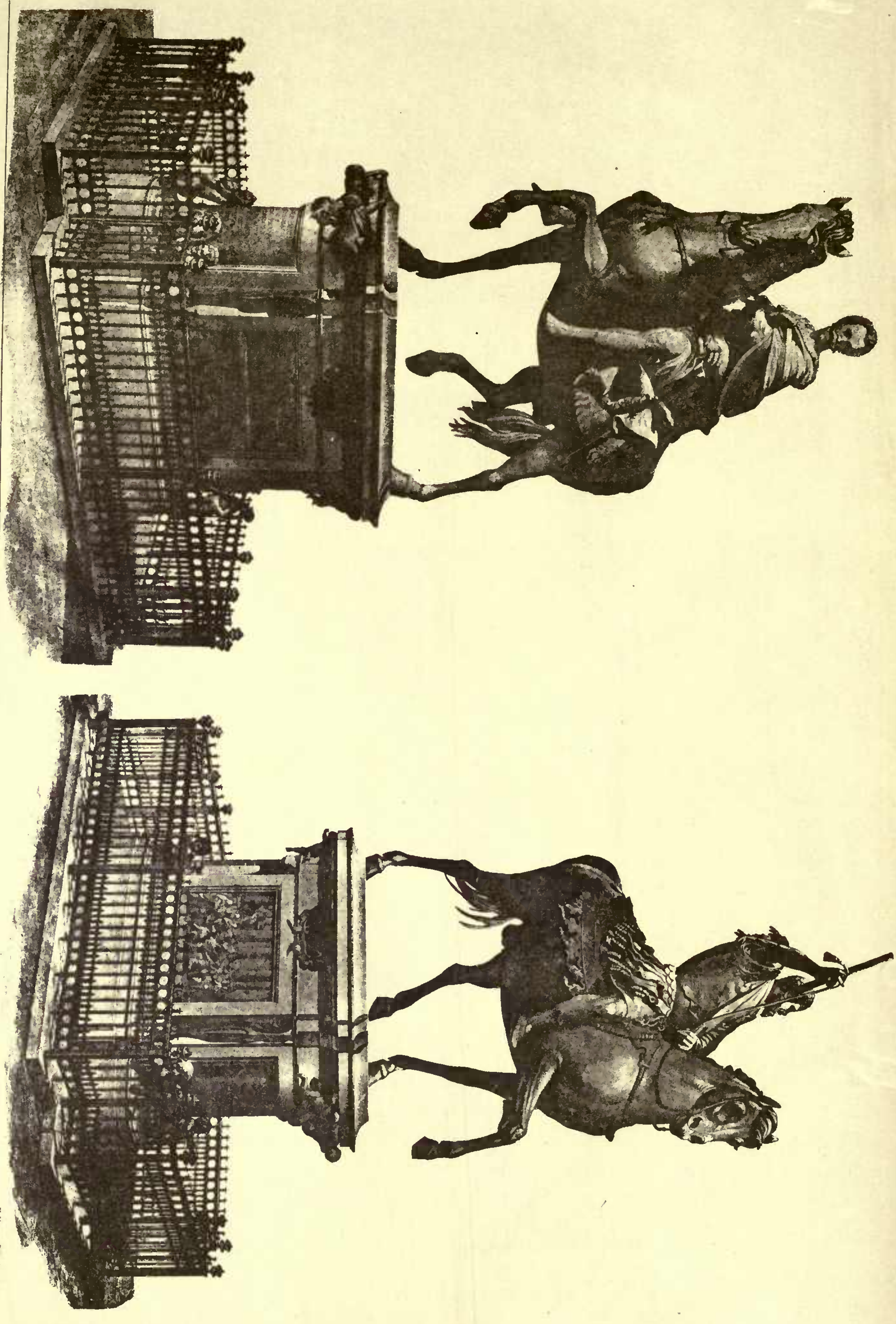
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· PALAZZO COMMUNALE · AND THE · STATUE OF ALESSANDRO FARNESE ·
· PIACENZA · ITALY ·



PLACE HOUSE, CORNWALL.

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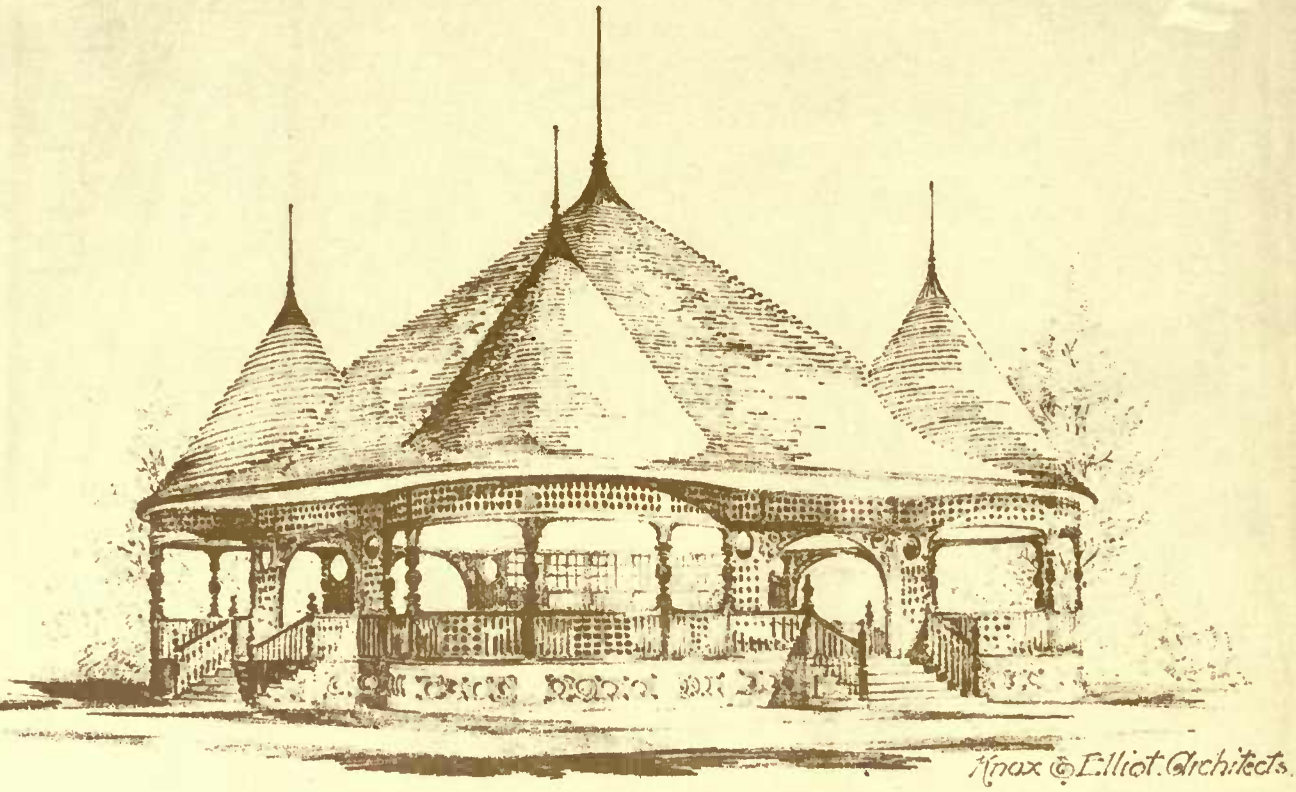


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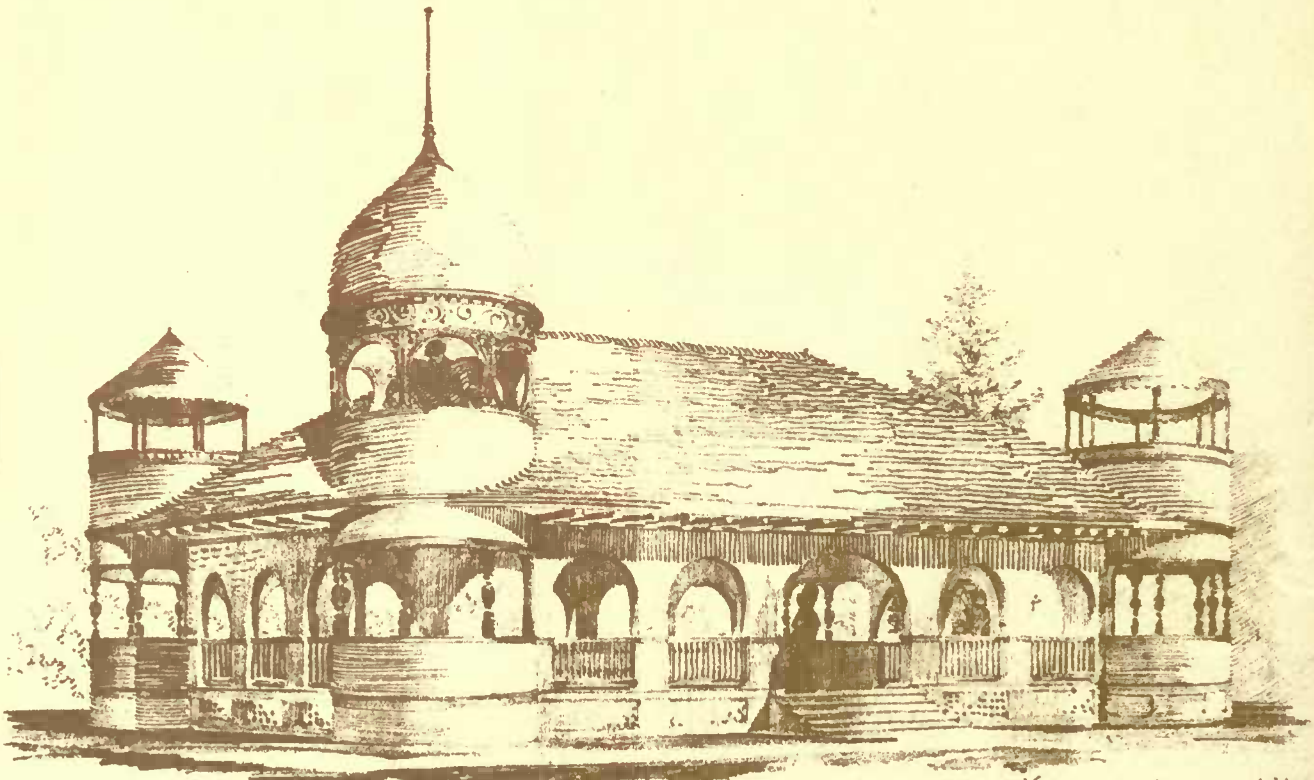


Knox & Elliot. Architects.

Accepted Design

CITY CLERKS' OFFICE.

Proposed Pavilion & Band Stand
Queen's Park.

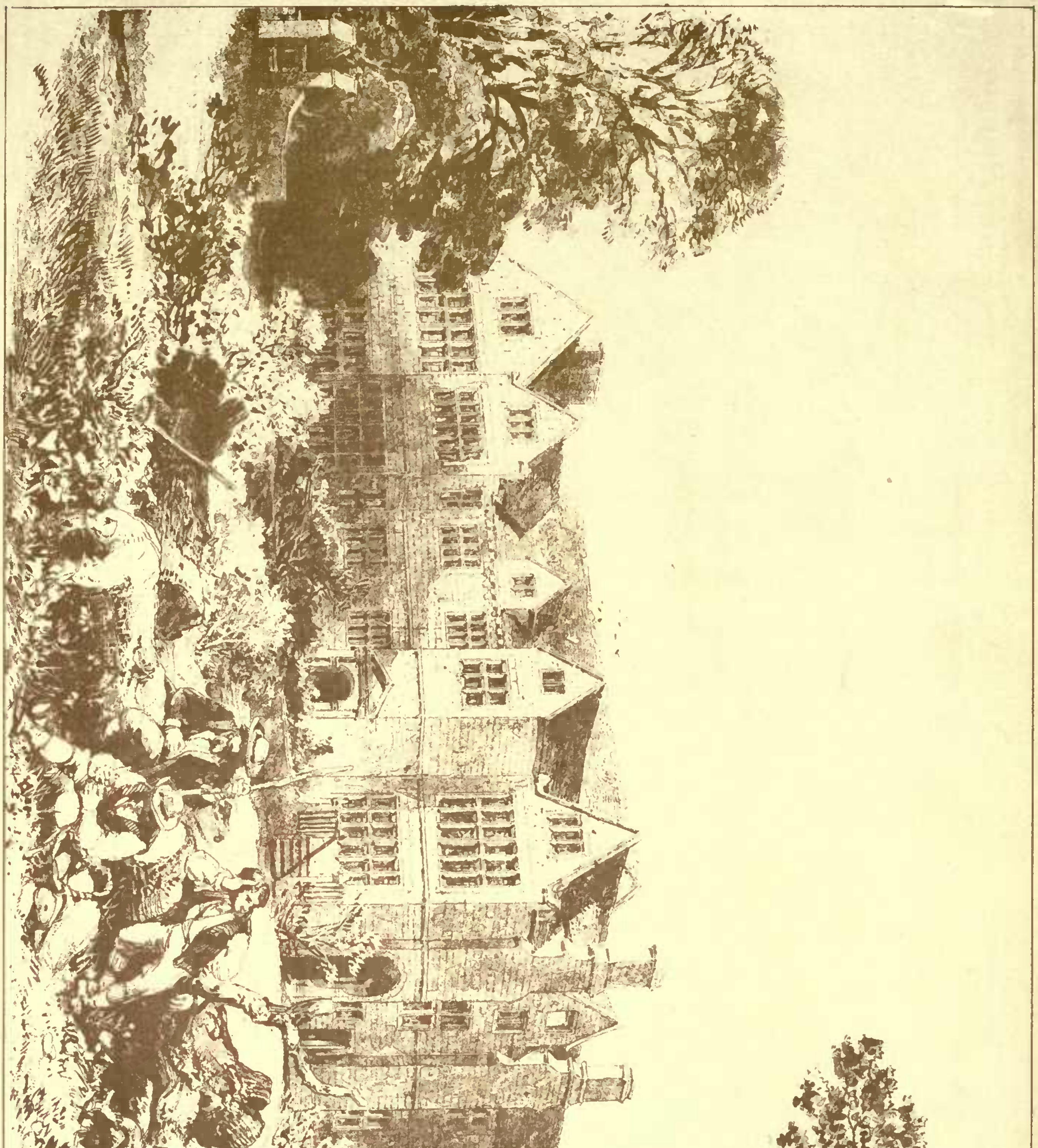


Knox & Elliot. Architects.

Accepted Design.

CITY CLERKS' OFFICE.

Sketch for Pavilion
at High Park.



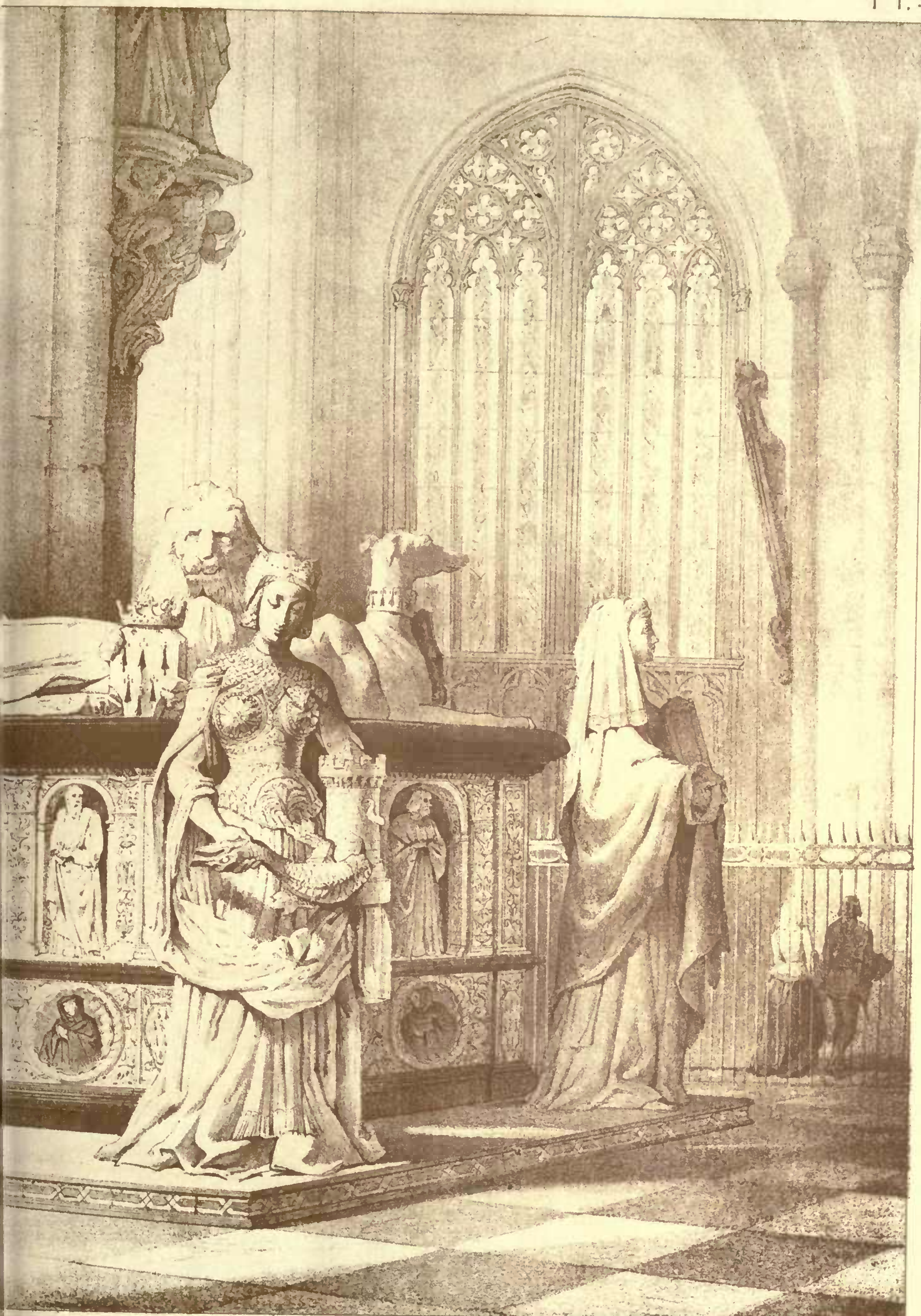
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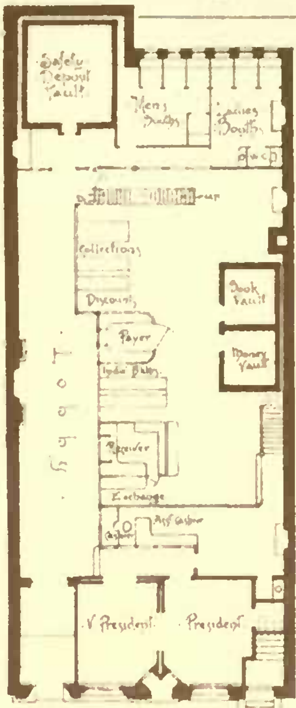


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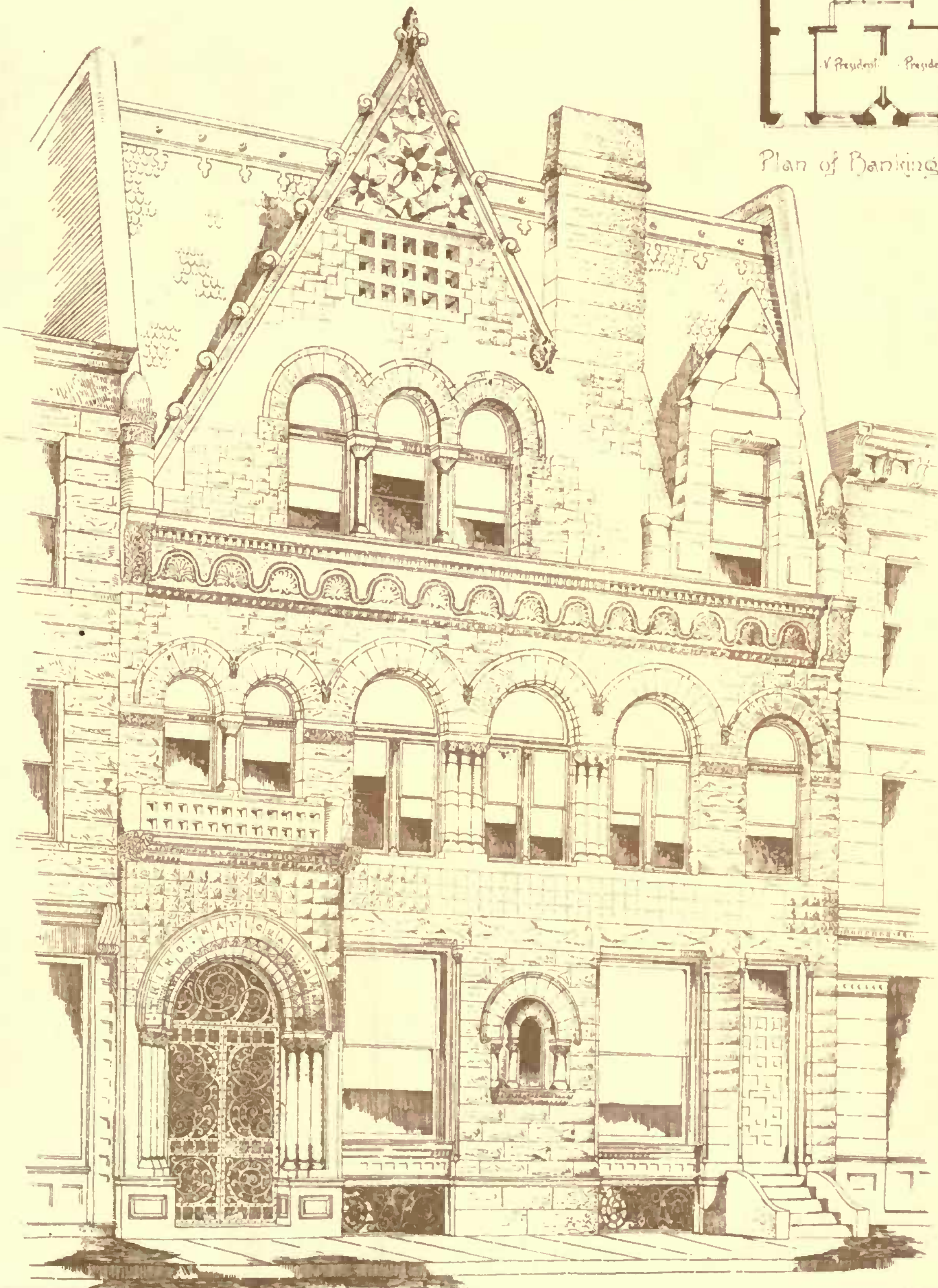
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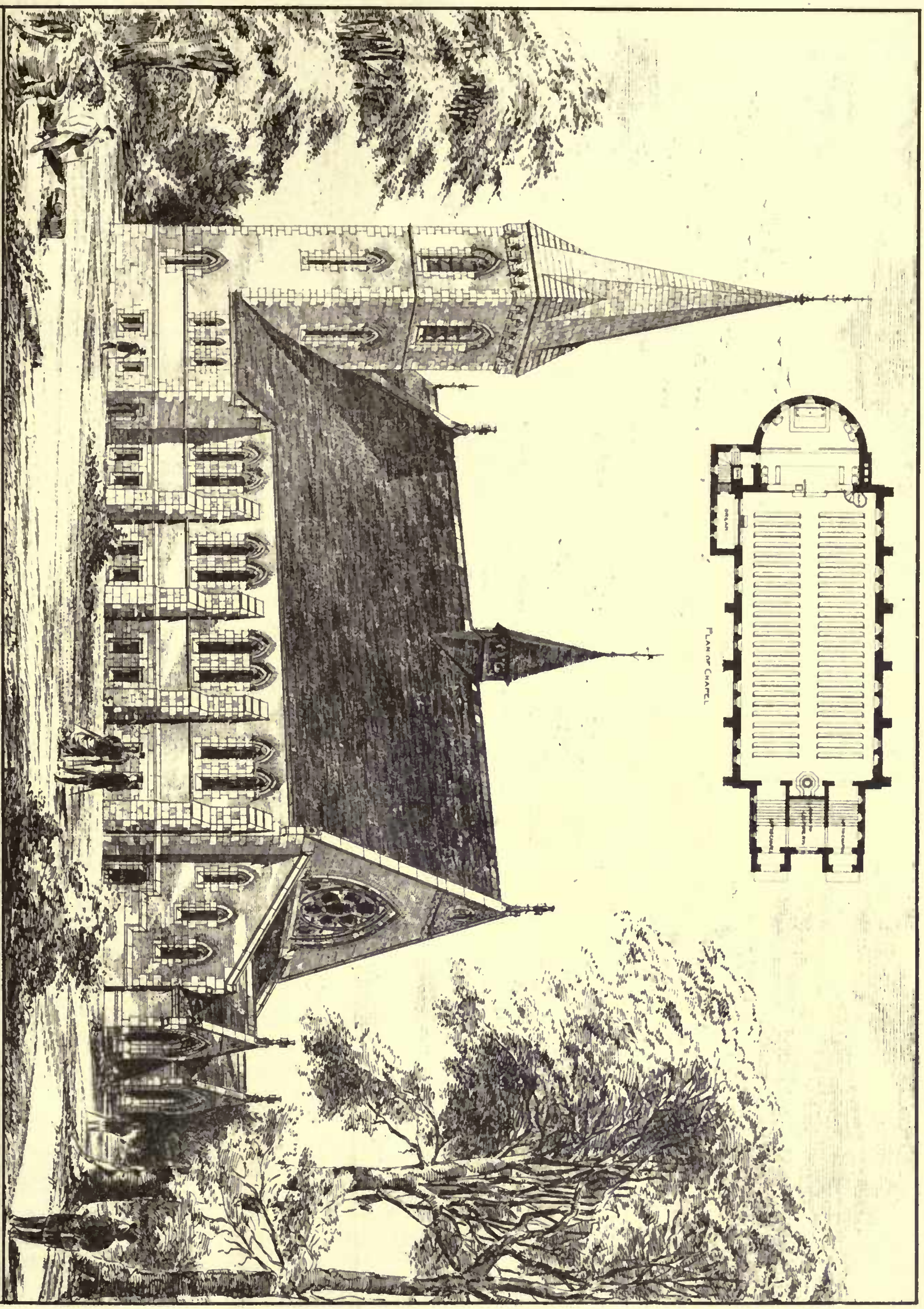
Third National Bank Bldg.
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H. E. Siter
Architect.
s.e cor 3d & Walnut Sts.
Cincinnati O.

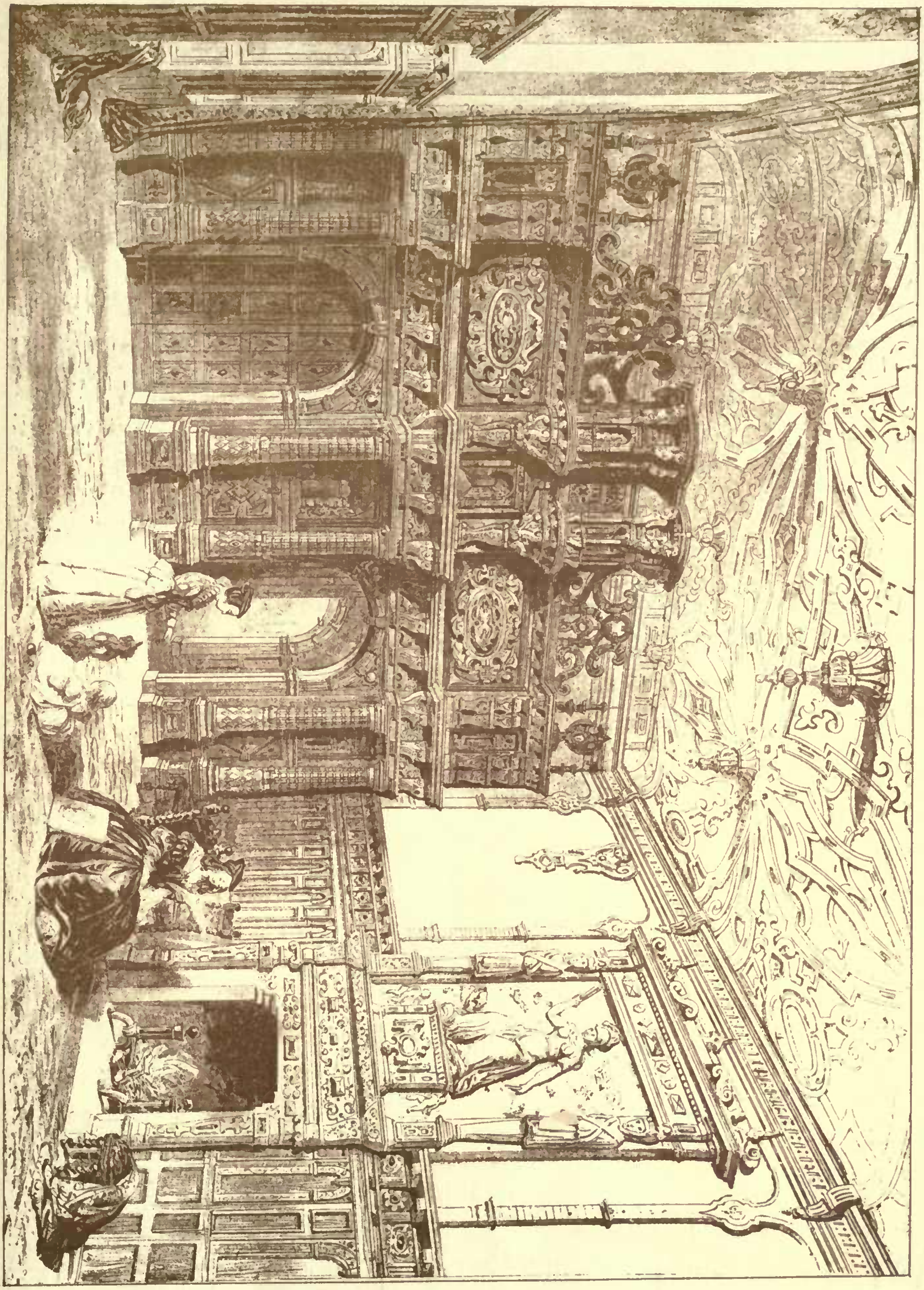


Plan of Banking Room





Chapel of The Good Shepherd, Blackwell's Island, New York City. Frederick C. Withers, Archt.



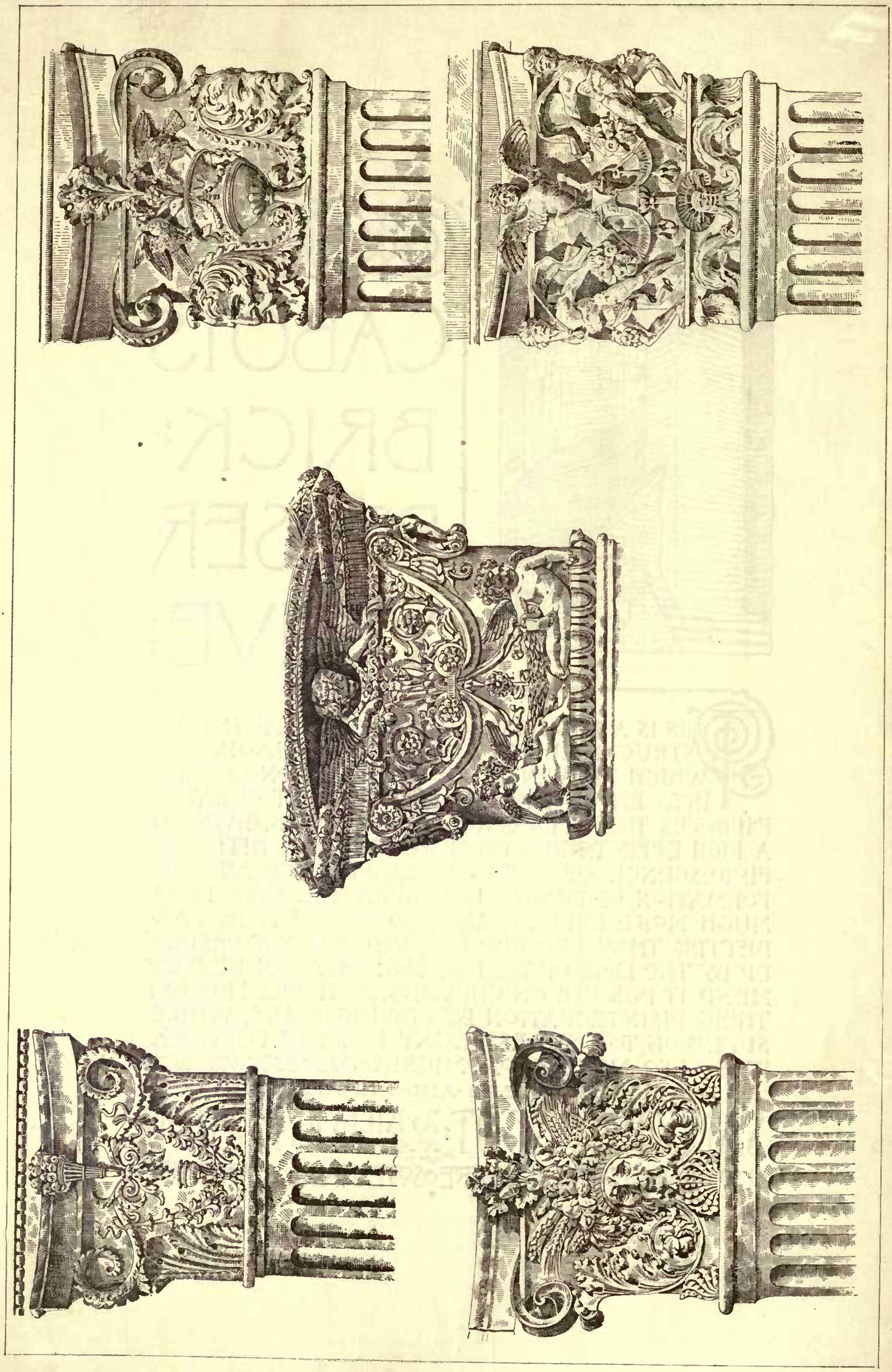
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· PLAZA DEL ORIENTE AND THE STATUE OF PHILIP IV ·
· MADRID · SPAIN ·



Italian Renaissance Capitals.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JULY 27, 1889.

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WE have for some time been anxious about the competition for the Criminal Court Building in the City-hall Park in New York, and it looks as if our fears might be justified. It will be remembered that the time allowed for preparing the plans was very short, and that nothing was said about having the award made by experts, the terms offered thus violating two of the cardinal principles of professional ethics in regard to public competitions. It appears that thirteen designs were received, notwithstanding the shortness of the time allowed, and after the Sinking Fund Commissioners, who had the matter in hand, had held two meetings to consider them, and had contemplated them long and earnestly, they concluded that it would be well to call in some "experts" to tell them which was the best. "Experts" were accordingly chosen, in the persons of the Superintendent of Public Buildings, the Chief Engineer of the Croton Aqueduct, and the Engineer of the Finance Department, who were requested to select three of the designs and report to the Board of Commissioners. This rather queer jury did what was requested of it, and reported that, in its opinion, the design marked with "an angel holding a pair of scales;" that with the motto, "Examine me well," and the one with the motto, "*Droit en avant*," were the best adapted for execution. It seems to us that the author of the first one mentioned ought to have been awarded the prize at once for his ingenuity in personifying in his cipher New York criminal justice. regarded from the criminal's point-of-view, if for nothing else, but the Commissioners apparently failed to appreciate the talent shown in this device, and chose a committee of their own number which finally came to the same conclusion as the experts. During the discussion, the question of the compensation of the architect came up, and some one suggested that it was usual to pay him five per cent on the cost in such cases. This appeared to the Commissioners "exorbitant," and the new committee on the choice of plans was further instructed to inquire of the Corporation Counsel what was the law in the matter, and to fix the amount to be paid to the architect in accordance with the information thus received. The chances are, we suppose, that the Corporation Counsel will report that where an architect delivers himself up bodily to the tender mercies of his employer, as those who entered the competition seem to have done, there is no need of paying him anything more than the smallest sum he will accept, rather than be discarded altogether. We need not say that the consideration for which the substratum of the profession will relieve the owner of the trouble of dispensing a million and a half dollars is a very modest one, and if the Sinking Fund Commissioners are going to award their work to the architect who will do it cheapest, it is time for the honest competitors to withdraw their plans, and escape from the affair, before it becomes so unsavory as to disgrace all those who may have been connected, however innocently, with it.

THE International Congress of Architects, which began its sessions in Paris on the seventeenth of June, does not appear to have accomplished a great deal for the interests of the profession, although it was interesting, and quite fully attended. The official report of the proceedings has not yet reached us, but we glean from the various foreign papers an account of the most important part of the work accomplished. The first business was the election of officers, and M. Bailly, the President of the Société Centrale, was chosen President of the Convention, M. Charles Garnier was chosen Vice-President, and nine honorary Vice-Presidents were also chosen, four MM. Daumet, Normand, Hermant and Guillaume, for France, Messrs. R. Phené Spiers and Herbert D. Appleton, for England, Mr. R. M. Hunt, who was present, for the United States, and Messrs. Leniman, for Germany, and Da Silva, for Portugal. After the President's address of welcome, the business of the Convention was opened by the reading of a paper on the "Teaching of Architecture," by M. de Baudot. The views of M. de Baudot, who was a friend and disciple of Viollet-le-Duc, are well-known to be unfavorable to the system pursued at the Ecole des Beaux-Arts, and he argued very effectively in favor of a more practical training for young architects, which should remove from them the reproach of being able only to make handsome water-color drawings. Although M. de Baudot was warmly applauded, the defenders of the present system of the Ecole des Beaux-Arts were probably in a majority in the Convention, and a little manœuvring took place between the two parties, in regard to the time at which the Convention should express by vote its opinion on the subject of the paper. A vote taken immediately after the reading of the paper would probably have been unfavorable to M. de Baudot's conclusions, and his friends endeavored, in consequence, to have the vote put off until a later day. The effort was successful, and a delay of three days was determined upon, in order that those holding views opposed to those of M. de Baudot and his friends might have time to present their side of the subject. This gave an opportunity for M. E. Guillaume, Professor of Architecture at the Ecole des Beaux-Arts, to make, on the third day of the Convention, an eloquent reply to the critics of the school, in which he referred to the ability and success with which the graduates of the school had practised construction, and said that the policy pursued there was to instil sound general principles, leaving individuals to apply these principles to the solution of the varying problems of each successive age. M. Guillaume's address was received with an enthusiasm which seems to have portended a rather lively contest when the time came for voting on the subject, and the Convention finally dodged the issue with great discretion, by adopting a resolution to refer the matter to the next Convention, which is not likely to be held for another ten years, at least.

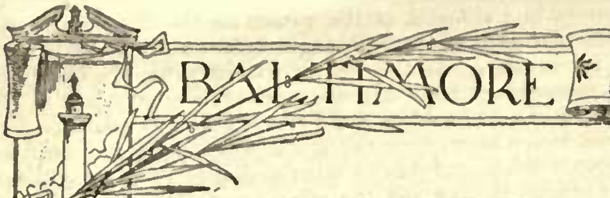
THE only other matter of great professional interest which came before the Convention was that of requiring architects to pass an examination and receive a diploma, before allowing them to practise. The arguments on both sides of this question are very familiar to us, and were presented with eloquence and force by M. Chevallier and others, but the Convention judiciously disposed of the matter in the same way as the previous one. Some resolutions were, however, passed, expressing the opinion of the Convention that means ought to be provided for pursuing advanced courses of architectural study in the professional schools, and that the property of architects in their designs ought to be protected in the same manner as that of other artists. The avoidance of exciting topics had at least the advantage of preserving the harmony of the meeting, and the uncontroversial papers, which were not very numerous, were listened to with complacency, while the excursions, to the great hall of the Trocadéro, the new Sorbonne, and other places, were much enjoyed, as was also the exhibition of portraits of architects, prepared by the Committee of Organization, which contained many curious old drawings of the professional heroes of past ages. The close of the proceedings was signalized by a banquet at the Hôtel Continental.

A CASE was decided by the civil tribunal at Brussels not long ago which has a considerable interest for architects. D, an architect, brought suit against O for six hundred and fifty dollars, balance of commission for the erection of a villa at Ostend, together with a further sum of seventy-three dollars, advanced for travelling expenses, fifty of which were spent in a trip to Berlin. A second claim was made for commission and travelling expenses for preparing a sketch for alterations in a city house for the same owner. In reply, it was claimed that the travelling expenses of architects were included in their commission; that the journey to Berlin was not requested or authorized by the defendant; that the work was unnecessarily delayed by the fault of the architect, so that the owner was not able to use his house until a year after the time when the contract required that it should be done; and that various defects, due to the fault of the architect, had been discovered and remedied, at a great expense, which ought justly to be paid by the architect. The court decided that the balance of commission claimed by the architect was moderate and fair, being calculated at the rate of five per cent on the cost; that necessary travelling expenses were properly charged in addition to the commission, but that the journey to Berlin had not been shown to have been either necessary or made at the request of the defendant; and that a commission of one per cent on the probable cost, with travelling expenses, was a proper charge for the sketches for the alteration which was not carried out. In regard to the counter-claims made by the defendant, the court found from the evidence that the contractor was ready to complete the building in the early spring, but that the cut stone, which was delivered from the quarry on a different contract, was not delivered in time to be used as it was wanted, through the fault of the architect, who was proved not to have sent the stone-drawings to the quarry until after the time when the contract required the roof to be on, so that the completion of the building was delayed through this cause until the following season; and decided that the architect ought to pay interest at the legal rate of five per cent for a year on the cost of the land, with the sums which had been paid by the owner on account of his building up to the time when he had expected to have it ready for occupancy, as compensation to the owner for the unexpected loss of the use of his capital for that period. In regard to the damage suffered by the bad construction of the building, owing to the architect's fault, the defendant admitted that the architect had not been called in or notified at the time when the alleged defects were investigated, but said that he could prove by ample expert evidence that the defects existed, and that they were due to the fault of the architect; but the court refused to hear his witnesses, saying that expert investigations of the architect's work made without notifying him to be present could not be admitted as evidence against him; and that as the defendant, by making repairs and changes on the recommendation of his experts, had obliterated the traces of the architect's misconduct, if they ever existed, he had by his own act made it now impossible to establish by a proper expert examination, under the order of the court, the faults that he alleged, and could not sustain any claim founded on them.

THE trades-unions in San Francisco came into collision the other day with a force which they will probably find considerably less amiable and easy of circumvention than the civil law. The committee of citizens which had in charge the arrangements for the celebration of the Fourth of July resolved to offer only six dollars per man for the services of the musicians in the bands, instead of the eight dollars which had been paid on previous occasions. The Musicians' Union thereupon issued orders that none of its members should play for the Citizens' Committee, and the Federated Trades organization came to its aid by forbidding any of its members who might be skilled in music from trying to take the places of the members of the Musicians' Union. As both parties remained firm, the Fourth of July procession marched without any music. It happened, however, that among the musicians who were expected to take part in it were the members of three regimental bands, who, although they belonged to the Musicians' Union, were regularly enlisted men in their several regiments of militia. Upon their failure to appear for duty, the colonels of their regiments took up the code of militia regulations to inquire into the duties of enlisted musicians. The code informed them that the appearance of all members of the regiments was obligatory in California at the parade on the Fourth of July, and the musicians are to be brought before a court-martial and tried for mutiny. As the officers concisely put the case, "If some non-military body has more power over any part of the military force stationed in San Francisco than the commander-in-chief, it is a better time to learn it now than to wait until an emergency arises, and they or other similar societies array themselves against the law and the officers appointed to administer the same." Most people will quite agree with the officers of the militia that it is time to find out how far the loyalty of these most necessary defenders of the peace can be depended upon, and a salutary example might be made of the first offenders by visiting upon them a punishment suitable to so gross a military fault.

ANOTHER instance of practical trades-unionism is reported from New York. A laborer applied for employment to the contractors for the new *World* Building, and, being known to be faithful and industrious, he was furnished with a hod, and set at work. His manner of performing his duty, however, proved very displeasing to his companions. If he had been left to himself, he would have carried so many bricks in a day that he would have saved his employers quite a little time and money, and even as it was, his efforts to work industriously caused his fellow workmen great disgust, and even annoyance, for after his hod was filled, his rapidity in carrying it to the place where the bricks were wanted left such a small space between him and the next hod-carrier in front of him, as compared with that which intervened between him and the next man behind him, as to give occasion to remarks from the spectators, somewhat to the disadvantage of the rear portion of the procession. It may be imagined how intolerable this levity was to the haughty favorites of politicians and cheap newspapers, and as there was no hod-carriers' union, to stop all the building-work in the city until the offender was driven into starvation, his companions decided to apply suitable remedies to the case on their own account. After several warnings, to the effect that he must work more slowly, which, rather from force of habit than malicious disobedience, were not satisfactorily heeded, the man next in front of him in the line which was returning with empty hods, seizing the opportunity, as his victim came up behind him, turned and raised the hod, and with the remark that he would "stop that business," brought it down on the industrious man's head, with a blow which laid him senseless and bleeding on the ground. A hospital surgeon was called, who sewed up the wound, and the industrious man was helped away, not to return. Whether he and his family, having found honest work in New York too dangerous a way of getting a living, are now begging in the streets, the *Tribune*, which tells the story, does not inform us, and it says that the man's employers were too busy to make any inquiries on the subject.

MR. EDWARD ATKINSON makes, in the *Paper World*, some interesting suggestions in regard to the possible use of wood-fibre as a building material. He thinks that both for roofing and for inserting in walls between the studs of a frame house, either wood-fibre in the shape of slabs, or straw-board in the same form, might prove a cheap and good material. From some experience of ours with straw-board intended to be used in that way, we doubt very much whether either this or wood-fibre could be economically used in place of plastering or shingles for ordinary buildings, although a very rough paper might possibly be made with wood-fibre, like the German "wood-cement" roofing-paper, which would serve a good purpose either with or without the addition of coats of tar. For certain other building purposes, however, the "indurated" fibre, such as pails and dishes are made of, might be very useful. Bath-tubs are already made of it, which seem to be serviceable, and if it could be readily moulded from architects' designs, like *papier-maché*, it might, we should think, be used to wainscot the inside of stone and brick walls. Being, when properly treated, impervious to water, it could be applied directly to the masonry, so as to avoid the inconvenience and danger of wooden furring, and the expense and other objectionable qualities of the terra-cotta and cement linings. As it would not warp or shrink, it would be much better than wood for such decorations, particularly where delicate painting was intended.



THE JOHNS HOPKINS HOSPITAL.

AFTER sixteen years — dating from the time of its endowment — given to the most exhaustive theoretical consideration of the scheme on the part of the trustees, and to the actual construction of the buildings, at a cost of two million and fifty thousand dollars, on the seventh of May the great Johns Hopkins Hospital of Baltimore, was finally opened to the public, with appropriate ceremonies, in the presence of a large number of distinguished medical men and scientists, representing various parts of the country, and declared by the Governor of the State to be ready, in its minutest detail, to begin the good work as originally intended by its founder, and for which so much time, thought, labor and money had been expended. We say "great," for this such an institution certainly is, but we most decidedly avoid the use of such unadvised superlatives as the "greatest" — "biggest" — "grandest" — hospital in the world, which we have frequently met in descriptions by enthusiastic reporters.

The Johns Hopkins Hospital is emphatically *not* the largest hospital in the world by any means, either as to the extent of its grounds and buildings, or the capacity of its accommodations; there are several in Europe that excel it in these points. What, however, it may justly claim to be, is the successful development of a scheme of arrangement and construction according to what both experience and science have, up to this date, taught to be the best methods, and on the large scale, and with the practically unlimited resources, rendered possible by its exceptionally liberal endowment. The result is a hospital, which, regarded from all points-of-view, is probably more nearly perfect for its purposes than any heretofore existing, but which, with the rapid march of scientific discovery, and the growing philanthropical tendency to making large endowments and bequests, may not, after the next decade, be able to claim even that preëminence. Standing as it does to-day, however, it is unquestionably one of the most important and valuable factors in the progress of a large city, and an institution that is destined to exert a broad influence in its own line, and to be conspicuously known throughout this country, and even in Europe.

Mr. Hopkins died in 1873, leaving of his immense wealth three millions and his extensive country seat to establish the University, and three millions four hundred thousands for the erection and endowment of the Hospital. In both cases it was his intention that only the interest of the fund should be used in the construction of buildings; this has been adhered to, the principal of the endowment fund has been increased by skilful handling, and now amounts to over three millions and a half.

As part of a great medical school, the Hospital will always be intimately connected with the University, but the two had different starting-points in their architectural development. The University began with professors and students, in one or two old dwelling-houses. The Hospital begins with its scheme of buildings practically completed and will gradually collect its staff and its patients. The different nature of the work of each was probably best provided for by these different lines of procedure. The University, however, has, in the last thirteen years, gradually raised unto itself various important and costly buildings, but which although doubtless admirably suited to the respective scientific purposes for which they are each designed, are so totally devoid of any special architectural interest in themselves, or any apparent suggestion of a general scheme of arrangement — scattered as they are, at hap-hazard through several blocks of the city — that it now looks very much as if there would never be any really dignified or monumental architecture worthy of the University to call forth any criticism whatever, a result greatly to be regretted, and one that hardly seems an absolute necessity, even while most carefully adhering to the conditions of the endowment, and avoiding the catastrophes too often attending a reckless expenditure upon architecture.

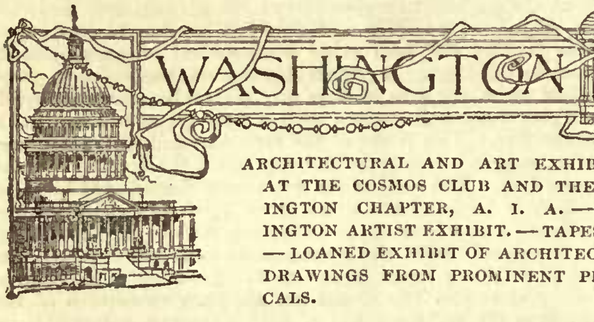
All the trustees were personal friends of the founder, and although he left their actions, as to details, quite free and untrammelled, he expressed to them clearly, both by word and letter, what his general intentions were. He wished to found a hospital, in his own words, "for the indigent sick of this city and its environs, without regard to sex, age or color, who may require surgical or medical treatment, and who can be received into it without peril to other inmates, and the poor of this city and State of all races who are stricken down by any casualty — without charge and for such periods of time as you may prescribe; to also provide for patients who are able to make compensation for the room and attention that they may require. . . to establish a training-school for nurses, and to provide for a site and buildings, of such description and at such distance from the city as your judgment shall approve, for the reception of convalescent patients; to secure the services of the hospital surgeons and physicians of the highest character and greatest skill. It is my especial request that the influences of religion be felt and impressed upon the whole management, but that the administration of the charity be undisturbed by sectarian influence, discipline or control . . . that the institution shall ultimately form a part of the Medical School of the University" — and he directed the trustees — "to obtain the advice and assistance of those at home and abroad who have achieved the greatest success in the construction and management of hospitals."

Thus instructed, the building-committee conferred with five distinguished physicians from different parts of the country, who had made hospitals a special study. They all contributed elaborate and able illustrated essays on the subject, which were published in a large volume, to be a sort of general guide for further action. Of these five men, one, Dr. John S. Billings, of the United States Army, was chosen medical adviser to the Board, and he began his work by first visiting and studying the best hospitals in this country and in Europe. Mr. John R. Niernsée, of Baltimore, since deceased, was selected as the architect to superintend the arrangement and construction, and, later on, Messrs. Cabot & Chandler, of Boston, to design the façades and such other architectural ornamentation as appears in the buildings. A remarkably fine site was secured, covering fourteen acres, the area of four city blocks, bounded by Broadway and three other wide streets, with a frontage of 709 feet and a depth ot 856 feet. This is one of the most elevated positions in the city, having a grand view over the city itself, the harbor and the Chesapeake Bay. The level of the ward-room floors is one hundred and twenty-four feet, and the dome three hundred feet above tidewater. Every most minute detail of the scheme was carefully reconsidered and revised before the arrangement, as it now appears, was finally adopted. Only by reference to the ground-plan diagram of the whole scheme can one obtain an adequate conception of the arrangement of the buildings and of such important points of their details as are there shown. No verbal description alone would suffice. A few of the prominent features may be referred to, however, that are of unusual interest. By way of statistics, there are in the building over twenty million bricks and thirty thousand barrels of cement, over three million feet of lumber, nearly five million pounds of wrought and cast iron, fifty pneumatic clocks, working together, and twenty telephones. There are six miles of underground drain-pipes and fifty miles of piping of all kinds. These pipes are all exposed in a great tunnel branching in various directions. The entire building is heated by a hot-water system, the largest pipes for which are twenty-six inches in diameter, wrapped in an inch thickness of felt, and supported on rollers, to allow for expansion and contraction. The provisions for ventilation and regulating the temperature, varying in different parts of the institution, are most complex and yet complete. The wards are on the "one-story" plan, with basements below and attics above; only one ward in each building, and the buildings are all connected by a corridor running around three sides of the great quadrangle, with the lawn, shrubbery and flowers in the centre. The materials used in the construction of all the buildings are Baltimore red brick, terra-cotta, Cheat River bluestone and slate roofs, with a certain amount of copper, galvanized-iron, *et cetera*.

To attempt a description of all the extensive, elaborate and minute scientific arrangements and appliances adapted to promote the highest degree of hygienic welfare in the hospital would be presuming in an architectural article, and an assumption of what is rightly the prerogative of the very men who conceived, designed and carried them out, and with their integrity, their unlimited resources and ample time, we may happily assume that in these important points the hospital is as nearly perfect as it can be made. When, however, we regard it as an architectural monument, looking at what has been done in the way of architectural design — and this is by no means little or inconspicuous, both in the mass and in the detail — it is much to be regretted that we cannot make the same unqualified statement. A most undeniable attempt has been made in the prominent portion of the group of buildings at both exterior and interior decoration, and where in all other points the aim has boldly been asserted to be to attain as nearly as possible perfection, the failure to do so in this respect is the more conspicuous. Architectural success in buildings of this nature largely depends upon *mass*, *simplicity* and *character* — things not easy to attain, but the result, when accomplished, is one of the most successful. These characteristics are not suggested in the architecture of the Hopkins Hospital; the effect produced is not impressive, and, recognizing the possibilities and the attempt, the result is almost frivolous. Nevertheless, the public is repeatedly called upon to admire even its smallest detail of design and ornament. Of a few of these minor points the criticism is very simple. The terra-cotta panels and moulding, and the pilasters, etc., of the façade, have no special merit in either design or application; without these attributes they were far better omitted. The construction of the interior of the dome containing the main stairway is of iron, with commonplace ornaments, more suited to stone or plaster, while the surface of the iron is treated with some roughened white preparation imitating plaster, and even the lower portion "grained" to repeat the oak wainscoting of the other side of the corridor. On the ceilings of the principal rooms of the administration building we notice the most commonplace plaster "centres" to be found in the "stock" collections, and in the lesser rooms excessively ordinary marble mantels, all of the same stock pattern. The wooden mantels and brass chandeliers of the larger rooms are pretentiously large and ornate, but of no individual

merit. Some of the furniture of these rooms is massive and expensive, while in one of them we find what we are told is the old library furniture of Mr. Hopkins — a laudable bit of sentiment, perhaps pardonable on the plea of association, although in this case the association suggested to the eye is that of the cabinet-makers' shop of the worst period.

We do not hesitate to dwell thus on these points, as they are details which, in the best work — certainly in France and England, and, indeed, in America — and particularly in a building of this character and importance, the architect would not fail to give his most careful attention, and often with the happiest results. Whether, in this case, the fault lay with the building-committee or not, perhaps the architects can best tell.



ARCHITECTURAL AND ART EXHIBITIONS AT THE COSMOS CLUB AND THE WASHINGTON CHAPTER, A. I. A. — WASHINGTON ARTIST EXHIBIT. — TAPESTRIES. — LOANED EXHIBIT OF ARCHITECTURAL DRAWINGS FROM PROMINENT PERIODICALS.

SINCE moving into their new room on F Street, the Washington Chapter, A. I. A., has held exhibitions at their regular monthly meetings of artistic or constructive interest to the members of the profession. The first exhibit was a unique collection of colored photographs, loaned by Mr. Robert Bigelow, of Japanese temples, altars, screens, gates and dwellings, some two hundred in number. They showed clearly the wonderful skill attained by this Oriental race in metal and porcelain work, as well as the pleasing effect produced by their surface-decoration, the picturesqueness of many of their small buildings and the grotesquesness of their idols and images.

The next was an exhibition of photogravures, from Appleton's "*Artistic Country Homes*," loaned by Mr. Robert Stead, which gave a good idea of the good and bad work which has been done by the profession in this country in recent years.

The walls of the Chapter-room were covered from floor to ceiling, at the third exhibition, by the working-drawings of the United States Soldiers' Home, plans, elevations, sections, scale and full-size details, loaned by Mr. W. M. Poindexter, the architect. Working-drawings are usually withheld from architectural exhibitions, and such exhibitions are made less interesting thereby. It is only in such drawings that we can see the actual working-methods of the architect, unclothed, as it were, by the dressy finish usually given to drawings made for show, and it is only from such drawings that methods of construction and detail can be properly studied. The building shown was interesting both artistically and constructively.

At one of the meetings Mr. Adolf Cluss read a paper on "Renaissance Architecture," the paper being illustrated by some fine copper-plate engravings. The rare ones by Piranesi being particularly good from the engraver's standpoint.

The exhibition given by the Chapter preceding its summer intermission was particularly interesting. The prominent periodicals were requested to loan the Chapter for the purpose of exhibiting, the drawings from which architectural illustrations in their papers had been reproduced. Such a large number were promised that it was determined to hold the exhibition in the assembly-room of the Cosmos Club, which had been kindly tendered the Chapter for the purpose, the exhibition being open to friends of the Club and Chapter. The *Century* loan consisted of about one hundred drawings, all of which were good examples of pen-and-ink or wash renderings, except the Greek Fraternity Building, which were inferior in design and draughtsmanship. The pen-and-ink interior and exterior sketches of English cathedrals, stood preëminently as the best drawings in this collection, and from their elaboration they were the most striking architecturally and artistically. The drawings by Bruner, Fenn, Stanford White, Emerson and others well-known to the artistic world were good examples of their methods of rendering.

Harper's Magazine loaned a set of drawings, showing Richardson's design for the Albany Cathedral, so well-known from its publication in different periodicals. From the size of the perspective and elevations the visitors were enabled much more fully to appreciate the dignity, repose and yet richness of this structure, which, for every reason, should have been accepted, instead of the design which is now being executed in Albany. This building, which our country has lost the credit of having erected, will probably never be equalled, as as we have no Richardson to design the Cathedral of St. John the Divine.

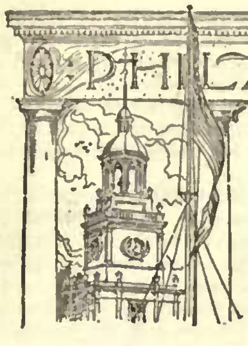
The *Engineering News and Building Record* sent fifty very charming sketches of business houses, residences and other current works. The selection for illustrations in this journal is remarkably good, showing some of the profession's best work, and the drawings of E. J. Meeker, Henry Neu and MacReady, show great skill, clearness and an aptitude in emphasizing the proper architectural features of the buildings depicted, well-worthy of study by all students and draughtsmen. There were several sketches in this collection of old colonial houses, from the pen of Mr. Frank E. Wallis, interesting from an architectural and historical standpoint, but lacking in draughtsmanship, because they seemed to be carelessly and coarsely drawn. *Building* was represented by fifty or more drawings which were in the majority of instances drawn stiffly, and in a more mechanical and less artistic manner than the sketches loaned by the other periodicals.

The *American Architect*, *Inland Architect* and *Building Budget* were not represented on their own behalf, the drawings which they publish being almost invariably returned to the contributors. But the first-named journal was well represented by about one hundred drawings loaned by three of its contributors, S. W. Mead, C. H. Blackall, Shepley, Rutan & Coolidge. The pencil sketches loaned by S. W. Mead were clear, delicate, sharp, showing crisply the desired outline, clearly indicating the form and character of the ornamentation, neither too much nor too little — the general verdict was that these pencil sketches were the most interesting in any collection at the exhibition. Of course, all such sketches lose their delicacy when reproduced by printers' ink or in any other method, so they were a treat which all enjoyed. The pen-sketches by C. H. Blackall were also charming bits of work second only to Mead's, in that they had a certain amount of hardness due to the difference between pen-and-ink and pencil work. The drawings submitted by these contributors attracted the notice and favorable comment of all the architects, and of the artists, of whom there are many in the club, as they were especially attracted by them. Mr. Mead also furnished quite a number of water-color sketches: a Venetian house, a bit of Moorish work and the tower of the Cathedral of Salamanca; they were all pleasant bits of color-sketching. There was a drawing of Trinity Church, Boston, in the *Century* collection, and by comparison it could be clearly seen that Richardson's tower was an evolution of the Salamanca one, and its improvement over the original in mass and detail, shows the proper and legitimate use to which genius has put ancient examples from and in all ages. Shepley, Rutan & Coolidge sent a fine lithograph of the Leland Stanford, Jr., University, in Palo Alto, Cal. This was the only picture on exhibition which was not an original. The method shown in the treatment of the University was quite original, the buildings being nearly all one-story high; in the centre of the group there was a large tower evidently modelled from Richardson's design for the Albany Cathedral.

The Cosmos Club has held several exhibitions in their assembly-rooms more or less interesting to the architectural profession. The walls of the club-room were covered with tapestries loaned by Mr. Fouke, an enthusiastic collector of this costly and beautiful wall-covering. The tapestries were all dated between 1600 and 1700, many were more or less faded and worn, — several pieces had been used for rugs and carpets before they came into the collector's hand. The owner read a paper explaining the different methods of making tapestries, and the difference between tapestries and embroideries, the first being woven in with the cloth, the latter being embroidered on the cloth after it was woven. The celebrated so-called Bayeux tapestries are really pieces of embroidery. Viewing the walls of a room covered with these tapestries, it is easy to appreciate their quiet effectiveness as a wall-covering in large apartments. Mr. Fouke also loaned for exhibition a collection of pastels and oils by Dvarok, a Polish artist, I believe. The pastels were pleasing, but the drawing in the oil figures was a little stiff and strained, while the flesh tints were unpleasantly pale. The most important exhibition given by the Cosmos Club during the year was the one held by the local artists. Washington is fast becoming a popular place for artists, as well as scientists and literateurs. The large majority of the pieces were of course mediocre. The two which I liked best were sheep pieces, by R. Le Grand Johnson, the attitude, grouping and expression of the sheep being natural and effective. The most pleasing landscapes were two or three by Max Weyl. The water-color portion of the exhibition was better than the oil, in that there were a larger number of good pieces hung on the wall. The small landscapes of De Lancy Gill, Victor Mindeleff and the small figure pieces by W. H. Holmes were particularly attractive.

The architectural portion of the exhibition was conspicuous by its smallness. The largest piece was the florid Gothic design made by Smithmeyer & Peltz for the new Congressional Library — not the design adopted. A good water-color of a private residence, Robert Stead, architect. A fairly-made pen-and-ink drawing of the Bank of Washington, J. G. Hill, architect. Several small colored sketches by Hornblowner & Marshall and by Bruce Gray. A rather coarsely rendered but effective drawing for a municipal building by Willis Polk, complete the list. Our architects have done some good work here in recent years, but their drawings, I suppose, have not been finished to the point which they consider suitable for exhibition.

A NEW WAY TO SETTLE STRIKES. — A strike among the employés of a factory here in Ohio was brought to a successful termination by the proprietor, who increased the wages of all the men working for him who were married, and notified all the single men that at the end of the month, unless they got married, they would be discharged, and if they became married men, he would raise their wages and retain them in his employ. This is certainly a singular way of doing business. — *The Artisan.*



PHILADELPHIA

PROPOSED CONSTITUTIONAL MONUMENT. — THE OFFICE-BUILDING MOVEMENT. — THE KOECKKLER BEQUEST TO THE PHILADELPHIA CHAPTER A. I. A. — A STAINED-GLASS WINDOW.

THE project for the erection of a monument in Fairmount Park to commemorate the adoption of the Federal Constitution, although still very far from completion, bids fair to succeed through the untiring energy of the men who are at the bottom of the movement. A year ago last September, during the bicentennial celebration of the adoption of the Constitution, there were present the governors of most of the thirteen original States. The idea of such a monument was then suggested to them for the first time. They considered it favorably, and agreed to meet here again on the Fourth of July of this year to take steps in the matter. Eight of the governors met accordingly, and decided to send a memorial to Congress asking for an appropriation of a quarter of a million dollars. A committee was instructed to prepare a bill for this purpose, to be reported next January, when another meeting will be held. All this seems a tiresomely slow way of going about the affair, but the committee agree in thinking that the money will be granted. Supposing it to be forthcoming, and everything going smoothly, there will be more necessity than ever of "going slow." It has not yet been decided whether the memorial shall take the form of an arch, a column or a building. And when this question shall have been settled there arises the great problem — the choice of a design. If Philadelphia is to solve this problem in anything like so fortunate a way as New York has the Washington memorial arch matter, it will be well for people who take a pride in their city, or who prefer that its monuments should be ornaments, rather than eye-sores, to see to it that the preliminary arrangements are being made in the most careful way possible, for it continually happens that work of this character is put into the hands of some incompetent person, or, at least, of one who does not rank with the first designers of the country. Badly-managed competitions are probably as fruitful a source as any of the execrable designs for monumental work that all of us know so well, and the evil extends, in a less degree, to buildings. It is true that competitions have lately been conducted in the most admirable way in many cases, and we have already in Philadelphia some invaluable precedents in this matter, which are often referred to as guides by companies, etc., about to ask for competitive plans. But in many places the old method still shows signs of life. The other day, for instance, Mr. Windrim received a letter postmarked Salt Lake City, and addressed with admirable simplicity, "Leading Architect, Philadelphia, Penn." It proved to be from the Board of Commissioners on Capitol Grounds, and begins: "Dear Sir,— We offer the sum of $500 for the best plan of a Capitol Building for this Territory, to cost not exceeding $3,000,000," etc. It is needless to quote further. When one considers that the architect making the successful plan would be out of pocket by the operation, it does not seem likely that this system will bring the men whose time is the most valuable to the front.

The common opinion that the "office-building craze" has been overdone has just received another shock by the decision of Messrs. Brown Brothers & Company to make an addition to their new building at Fourth and Chestnut Streets larger, even, than the present one. Mr. T. P. Chandler, Jr., the architect of this very graceful building, is at work on the sketches for the addition. The problem is made more interesting than otherwise — and it is to be doubted if the building will lose anything in beauty by it — from the fact that, owing to the new law widening Chestnut Street, the addition must recede three feet from the old building-line. Of two other buildings by the same architect, that for the Commercial Union is nearing completion, and the Penn Mutual's is just begun. And yet Mr. Chandler, with these and a vast amount of other work on hand, has decided to try a new experiment, which, it appears, is working to complete satisfaction. He has taken a cottage at Atlantic City, and moved his office into it for the summer. The city office is kept open, meanwhile, with a very small force in it, and is connected by telephone with the headquarters at the seashore.

By the will of the late Mr. Koeckkler, whose death occurred last week, the American Institute of Architects inherits a very considerable sum of money. Mr. Koeckkler had travelled a good deal in the course of his studies, and was taught the practice of architecture in Mr. Walters's office, where he had a responsible part in the design of Girard College, a building that puts to shame most of the Classical designs that have been attempted since. He was nearly seventy years old at the time of his death, and had long since retired from active practice. As an Associate Member of the Institute, however, he had always kept up the liveliest interest in that body, and is found to have left all his fortune — with a trifling reservation — to its use.

There is now at the rooms of the Centuries Stained-Glass Company on Eleventh Street a window that for many reasons is well worthy a visit. It was designed by Mr. H. T. Cariss for a church in New York. The window is a memorial one, suggesting a scene from "*The Pilgrim's Progress.*" The composition is very simple. An angel standing with outstretched arm by the side of a rocky path points out to an inquiring pilgrim on her right the way he is to follow. The dark-brown trunk of a willow slants across the background of the picture from left to right. A circular-topped border in browns, and an unobtrusive design at the bottom in blue and brown complete the picture. The window is double-glazed, with an air-space of about two inches. This accomplishes many things that are often hard to find even in good, single-thick, stained-glass. It gives an amazing effect of depth and clearness to the sky, of which the inside layer is clear, crinkled glass, and the outside of the new sort known as semi-opalescent, slightly tinged with blue in places. It gives a richness obtainable in no other way to the color of tree and rock and gown, and, more important still, helps to bring everything into tone. It is very interesting to notice the use that Mr. Cariss has made of the latest experiments in colored glass, especially in representing the texture of stuffs. Whereas there is no painting whatever except on the hands, feet and faces of the figures, and a few black lines of the thickness of the lead-lines (which last are managed, by the way, with the greatest skill and judgment), the coarse fabric of the pilgrim's cloak has all the effect of elaborately stippled work, with none of its opacity; and the gown of the angel, cut out of a marvellously rich brown glass with an even surface, but of varying depth of color, looks, but for its superior brilliancy, like an elaborately painted brocade pattern.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE AT WASHINGTON, D. C. MR. JAMES G. HILL, ARCHITECT, WASHINGTON, D. C.

[Gelatine Print, issued only with the Imperial Edition.]

THE JOHNS HOPKINS HOSPITAL, BALTIMORE, MD. MESSRS. J. NIERNSÉE, BALTIMORE, MD., AND CABOT & CHANDLER, BOSTON, MASS., ARCHITECTS.

SEE letter from "Baltimore," elsewhere in this issue.

HOUSE OF G. W. MARSH, ESQ., BRIDGEPORT, CONN. MR. J. W. NORTHROP, ARCHITECT, BRIDGEPORT, CONN.

COMPETITIVE DESIGN FOR THE AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

HOUSE FOR MISS BEARDSLEY, PLYMOUTH, MASS. MR. WILLIS POLK, ARCHITECT, NEW YORK, N. Y.



CANADA

PROFESSIONAL EDUCATION IN CANADA. — TORONTO GUILD OF ARCHITECTS. — ONTARIO ASSOCIATION OF ARCHITECTS. — THE C. P. R. R. AND THE TORONTO WATER-FRONT. — KINGSTON AND WOLFE ISLAND STONE.

STUDENTS of architecture on this vast continent of America, and perhaps more especially in Canada, are in a very awkward position, resembling in a particular manner the Children of Israel who were told to make bricks, but no straw was given them to make them out of, or, according to the New Testament, resembling the person told to be warmed and fed, while the wherewithal was not given him. A youth is told by his parent to "learn architecture," but where is he to learn it? "To learn to be an architect" is another expression one often meets with; that, perhaps, is the more practical advice nowadays. One *can* "learn to be an architect," but as there are several species of the same *genus*, the

youth can pick and choose as to which kind of architect he will learn to be. In Canada, we have great disadvantages to contend against in the practice of the art. An old-world country has been built up century after century, its builders and its artists have left the monuments of their genius to mark the progress of art, and the student of architecture has but to look around him for examples. America, though a new nation, *is* a nation in itself, capable of developing its national characteristics, its own art and its own science, but a colony of an old-world country is a people who possess, instinctively, all the national characteristics of the mother country, but who are thrown on their beam-ends to live, to develop art and science for themselves without examples to instruct them, without, so far as art is concerned, the "straw" to do the work with. Naturally, their examples are sought from the nearest country, but those seeking them are ignorant of what is good or bad, and students are to "learn architecture" from such a standpoint or starting-point as this. It is very deplorable, but, if you look round for a student, you find, instead, a very peculiar creature, who believes he is a student, but cannot say exactly what he is a student of. He "is studying architecture" — very good, but where are the objects of study? The answer is, "every house, church, shop, bank, etc., in every street that ever was built in such and such a particular town." A wide and varied field for study certainly, but it is sickening to think that those who would be the practicers of an art as old as the hills should know nothing more about it than they can gather from every jerry building put up from designs emanating from the brain of a totally uneducated person. Of course, there are good, clever designs and well-built buildings, but, as a rule, the students of one office will be very critical over the work that comes out of another office, and however good the work may be, or beautiful the design, they, without having some one to point out its good parts, will fail to profit by it. The system of education is all wrong, in fact there is hardly any system at all. A youth goes to an office for what salary he can get, and as soon as you begin to take an interest in him and his progress, which you have as "boss" brought about, you find he wants to go to another office where he could get a little higher pay, or, perhaps, has an opportunity of bettering himself, as he thinks, by going into some clerkship or other. Sometimes it is possible to bind a youth, by making him pay a premium at the outset, but the premium that can be obtained is so small that, except because it prevents the pupil throwing up the work, it is not of much service. It is customary with some to use it by way of bonus to the pupil as he progresses, which is probably the best way, for every one knows that a pupil is not much use as a clerk till the end of his first year, at any rate, but, fifty dollars a year for four years, is not enough to give much encouragement to the student. Undoubtedly, it is hard on the youth, who sees other fellows all earning a salary and helping themselves and their parents to live, and he feels acutely that though sixteen to twenty years of age he is still drawing from the family funds, and being, perhaps, a drag on his father's purse, while all his companions are comparatively independent. The usual custom is to pay a youth a progressive salary and then he "learns architecture," or "learns to be an architect" as well as he can. How is one to distinguish between architects and "architects," what term would adequately express the difference? One is a genius, the other but a jobber or trafficker in the profession. Let us call them "jobbing architects," then. Well, a jobbing architect does not care "a little d —" about his clerks' or pupils' progress, and if one of them wants to leave his office, he can at any moment replace him, and perhaps benefit himself by the change, by drawing a clerk from an architect's office who will be able to bring with him a few "pointers." But, to the architect, it is a very serious matter. He does not so much care about the premium, but he wants a youth to train who will be of the greatest possible use to him, and as a trustee for his education as he virtually becomes, wishes to do his best for him, and help him to do the best he can for himself. But the architect has not time to teach him from the beginning, he ought to be able to get, at any rate, the rudiments of the profession taught him elsewhere, and this has at last become such a pressing necessity that steps are being taken to bring it about. There are "students" in Canada who have been in and about architects' offices for four, five and six years, and yet, at the end of that time, they are but draughtsmen — looking upon the study of architecture as pleasant if they could spare the time to it, but by no means necessary to them as architects, and it has never been pointed out to them that it is necessary. It is very certain that no architect has any more right to take a "pupil" who cannot find means to instruct him than he has to obtain money under false pretences, for it comes to that if there is a premium, and, at any rate, it is obtaining a youth's service under false pretences, — and yet it is constantly done.

The splendid college arrangements of the United States for the education of students are needed in every country, but they are such an advance upon the old state of things that it must be long before a young colony can attempt anything on so definite and great a scale.

But our want of a system in Canada is worse than the old arrangement of older countries. Some of us have had our professional educations in England, and we may be very thankful for it, but how did we get it. In London, long hours, dismal, dreary offices, bullied by head-clerks and driven to ventilating our grievances in the columns of the *Building News* — that is one way — or part of the way. Another part is without so many disadvantages: determined to progress, we put up with inconveniences and have the advantages of glorious examples of art and construction, access to splendid libraries, membership of associations for mutual instruction after office-hours, occasional trips into the country where opportunities occur for the study of various branches of professional interest, but we have to pay for all this by premiums, varying anywhere between £100 sterling to £1,000, according to the professional status of the "principal," and out of our own pockets for everything outside the office.

The various associations, guilds and societies that are springing up in the different towns of Canada, all have in view, however indefinitely at present, the improvement of professional education: improved mutual understanding between the various firms, engenders more genial feelings among students; as the principals join in friendly intercourse so will the students, and as the seniors' societies become established and the benefit accrues to members and the profession generally, it is to be hoped the students will endeavor to form associations under the advice and supervision of their seniors, and waste no further time in the futile attempt to perfect themselves individually without mutual coöperation. Then, indeed, and then only, will it be possible for us to talk about "standards." Out of such associating will grow the strength of the profession, and we may ultimately see a school of architecture which, under present circumstances, it would be useless to inaugurate. Our "students" in Canada are like "sheep without a shepherd"; in Montreal there is no attempt at mutual improvement, in Halifax, Ottawa and Hamilton they appear to be asleep, while in Toronto, though half-awake, they work by fits and starts, as if suffering from nightmare. But, like "Mrs. Dombey," if they would "only make an effort" there is no end of good they might do themselves.

The Architectural Guild of Toronto, originally an informal social association of practising architects, has recently framed and passed a code of by-laws. Its membership numbers from twenty-five to thirty, and by-laws have been found necessary for its guidance. The summer monthly meetings are held out of town at various places, where the members transact the business, see anything of interest there may be in the neighborhood and get a half-holiday.

The Committee of the Ontario Association of Architects has held its semi-annual committee-meeting to arrange a programme for the annual meeting to take place in November next, in Toronto. It is proposed to hold a two days' session, and papers will be read by members on various subjects of general interest to the profession. But at this season, the notion of sitting in a crowded room listening to essays is rather appalling, one prefers to sit without one's coat in the cool shade, if it can be found, and one has quite enough of one's office this hot weather to make one anxious to get out of town as soon as possible, without thinking of "papers."

The Canadian Pacific Railway has all Toronto in arms against it at present, in reference to the proposal of the company to expropriate, by the power of its charter, a very large portion of the water-front of the city, in addition to that already granted to it, subject to satisfactory arrangements as to compensation to be paid to the city. The water-front of the city has been fearfully muddled, the Grand Trunk Railway cutting it off from the city. There are no bridges, and the hundreds of people who have to reach the wharves and steamboats, either for business or pleasure, do so daily at the risk of serious accidents, by level-crossings, without any barrier or watchman to warn them of coming trains. Even to reach the principal entrance of the Grand Trunk station itself, one has to cross the main lines of the railway, but at this point there is a barrier, lowered when a train is about to pass. When this railway company came to Toronto first, some thirty years ago, no one seems to have had any notion that to allow it to separate the city from the water entirely was a very foolish proceeding, and now that the Canadian Pacific wants to run along-side the Grand Trunk and add to the lines to be crossed, the inhabitants are crying "stop!"

Experiments have been made upon the comparative strengths of Kingston and Wolfe Island limestones. The Kingston is a very hard stone, but nothing in comparison with the other. The usual two-inch cubes were used, the Kingston stone fracturing under a weight of 5,000 pounds, while the Wolfe Island withstood the pressure up to 41,000, fracturing then, but resisting still, until at 50,000 pounds weight it burst and fragments flew from under the weight. While at 14,000 pounds pressure the Kingston stone was ground to powder.

A rather curious case has recently occurred in Montreal, which ought to be a warning to those foolish people who try to save an architect's commission. A firm recently employed a builder to erect a warehouse at a cost of $25,000 for their immediate use. When the building was completed, it was condemned by the inspector, and had to be demolished without delay. Instead, however, of going to law about it and endeavoring to collect damages from the contractor, the firm have come to an amicable arrangement by which the contractor is to rebuild a portion of the structure, at his own expense, the firm doing the rest and smiling at their loss.

A Million Bushels. — We read about a million bushels of wheat, but few people realize what a vast amount it is. But if a million bushels of wheat were loaded on freight cars, 500 bushels to the car, it would fill a train fifteen miles long. If transported by wagons the line of teams would be 142 miles long. And yet we consume and export more than four hundred millions of bushels of wheat annually. — *N. Y. Herald.*

PARIS.

THE CERAMIC GALLERY. — THE FURNITURE EXHIBITS.

WE are going to-day to take a turn in the French Industrial Section, commencing at the right of the central gallery, going from the rotunda toward the machinery gallery. It is on this side that I find the most interesting art-industries which have some bond of union with architecture; namely, goldsmith's work, stained-glass and ceramics, tapestry, furniture, bronzes and heating apparatus. We will take our trip a little at random as we may be attracted here or there, and first we are drawn to the ceramics. I have already spoken of the monumental doorway which is the entrance to the ceramic display: on entering this section we find at right and left the exhibits of Messrs. Guerin & Deck, which complete the decorative *ensemble* of this entrance by beautiful vases placed on the balustrade. Among the most beautiful ceramic products exhibited, I will mention because of their architectural treatment, those of Messrs. Lœbnitz, which are particularly well arranged in an elegant portico, signed by P. Sédille, Muller, Parvillée, Guilbert-Martin, and Boulenger. We shall find elsewhere all these names when examining in detail the decorative portions of the two palaces of fine arts and the liberal arts. M. Facchina, besides very fine mosaic pavements, exhibits a beautiful copy of a fresco by Tièpolo, from the Palazzo Labia, Venice. Mosaic-work occupies a very important place in the Exhibition, and we find it shown pretty much everywhere. I have already mentioned the doorway in the gallery, of thirty metres, executed by the State atelier of mosaics at the Gobelins, and the fountain by M. Guilbert-Martin, who in Class 20 also exposes enamels and colored crystals of great beauty. That which characterizes the exhibit of ceramics is the richness which its employment adds to decorative architecture and the frequency of its use in this special way. To-day there are made plaques for the walls and mosaic-work for the floors of a design and color which compare favorably with the beautiful antique faiences, particularly the extremely interesting wall tile-work of Tourmaintrau-Courquin, of Desvres, which we shall admire presently at the Algerian palace, where we can examine them as a whole and in grand surfaces.

In the way of mosaics we have those of M. Zambon, and those in marble by Messrs. Burke & Co., and amongst the interesting pavements the mosaic-work in *grès césame* laid in Portland cement, by M. Simons. Also, there should be mentioned the pavements of Messrs. Piquot, Colle et Fils, Boulenger, and the exhibits of MM. Gustave Roy, Raffin, and Ameuille, and especially those by Boch, of the works at Maubeuge. The architectural ceramic decorations in enamelled lava by MM. Gillet and Lefort, of Ylouses, are very curious and possess great richness, and the faiences of M. Farque have much beauty of color and are extremely brilliant.

In the line of things less particularly architectural, but which, nevertheless, are connected with it through decorative interests, there should be mentioned the beautiful ceramics in Palissy ware of MM. Pull, father and son, who exhibit as their chief piece a reproduction of a part of the chimneypiece of Germain Pilon in the Salle de la Renaissance at the Louvre, and also the faience of M. Gallé, of Nancy, whom I have already mentioned when speaking of the pavilion in the grand gallery of sculptured wood and marquetry, whose decoration is inspired from paleontological flowers.

There may be seen in the exhibit of M. Gallé in the ceramic class a curious perforated partition of amaranth wood and lake oak, very elegant in form and containing a most noticeable artistic note.

The art pottery of the Gulf Juan exhibited by Clement Mossier, has much richness. We remark particularly two faience wall-panels which have a metallic lustre in the Persian style, which are truly magnificent; but the difficulty of the execution which prevents one's ever foreseeing the results renders the price of this product excessively dear and consequently prevents its having any practical utility.

It is necessary to examine everything in this magnificent class, which includes also the faience work from Creil, Montereau, Limoges, Blois, Nevers, etc., and which prove how our times will occupy a glorious place in the general history of faience and ceramic work, and what grand and fair part will be that of France the progress of the Exhibition makes clear.

Class 20, which we have just passed through hurriedly, connects with Class 17, furniture. The eye is at once attracted by the Renaissance stairway which occupies the centre of the space and gives access to a saloon which overlooks the whole gallery. It is the exhibit of the Maison Damon, and is a very beautiful example of luxurious furnishing. This construction, for it is really one, was composed by M. Gambier, architect. The staircase, in three runs with two landings, is decorated with elegant balustrades, and at the bottom are two female figures. The saloon opens on the last landing through a great arch decorated with sculpture, on each side of which is found a bay composed of two smaller arches with a column like a mullion between, and pierced above with a circular opening, in which is seated a draped female figure. This beautiful composition in oak wood and mahogany forms a very beautiful combination, and would make a very rich feature at the end of a gallery of assembly, for instance. The figures, in solid mahogany, were executed after models by M. G. Deloye. This exhibit, the most important of all, has the stamp of modernness in an interesting way, and makes a contrast with all the copies and imitations of antique styles which we find in most of the furniture exhibited. Originality is too often wanting. The Renaissance, Gothic (Gothic especially), the English style, the Japanese style, are more or less happily copied, but we rarely find a piece of furniture composed without researches into ancient styles or retrospective souvenirs, and consequently rarely really new. This is a blessing, and it is an evil. The evil does not need pointing out at length. It is the absence of progress in the composition of a bit of furniture responding, in the history of furniture, to the epoch in which we live. It is clear that the nineteenth century, which has not more than a dozen years to live, runs a great risk of giving birth to no style which is unquestionably new, and, nevertheless, as an eminent critic of art, Henry Havard, has said, "These restorations have a good side. They have had a singularly fertile influence on the fate of French furniture." In the first place through direct comparison they have allowed the reëstablishment of the perfection of manual work in our time. They attest in fact that in the way of ability and knowledge our artisans have no reason for envying their predecessors. The study necessary for this restoration has also brought about the education of a very army of designers, workers in bronze and ebony, who in applying ancient forms and decorations to new uses will succeed, we will hope, in creating the new style which we all clamor after.

Among the houses which have interesting exhibits, although for the most part deserving the same reproach of copied and tormented compositions, I will mention the houses of Flachat, Cochet of Lyons, Drapier, Zwiener, Raulin, Schneider, Roll, Schmidt, Piollet and Perol, who exhibit well-studied pieces of furniture, among which we find the evidence of a searching after originality, which is sometimes interesting. The Japanese style is very richly represented by M. G. Viardot & Co., whose furniture is particularly elegant and distinguished. It is Japan with a Parisian accent and originality of feeling. The Maisons Bailly, Théroux and Warth, of Tours, also show Japanese furniture well-studied, as well as the Maison Ruffier, of Aimes.

M. Blanqui exhibits a very heavy and massive cabinet, although it was designed by M. Paul Sédille, but quite perfect in point of execution. M. Malard has reproduced in a curious manner a bed-chamber of the thirteenth century, after Viollet-le-Duc. It is original in idea, but the success of the effort is open to discussion. One of the most interesting exhibits in this class is that of M. Gallé, of Nancy, whose work we have already admired in the ceramic gallery. Here at length are pieces of furniture which are artistic, not commonplace, but having a characteristic stamp. Among other things I will mention a great extension-table, of walnut and plum-tree wood. In the centre of the gallery stands a fine pulpit of carved wood executed by MM. Moisseron and André, at Angers, for the church at Beaufort, graceful in style, but perhaps rather too pretty for a church, and wanting the severe religious character which ought to be imprinted on this kind of furniture. Among the makers of furniture of antique model, so sought after by a certain public who believe that they have a stylish piece of furniture when it is overloaded with ornaments, sculpture, leafage, columns, figures of men and animals or fantastic beings, there must be mentioned the houses of Drouard, Hertenstein, Porte-Secretain, Huguet, Brossier, Cruyen, etc. Here and there we find in different exhibits a bit of furniture less tormented and more pure in style, but everything has an appearance of extravagance.

Before leaving the furniture gallery, I wish to say a word of the exhibit of M. Rabinel, ingenieur des Arts et Manufacturers, who shows some ornaments in carved wood, very interesting because of the ease with which they could be used in architecture. Here are found ready-made *motifs* of every kind, mouldings, running ornaments of every style, friezes, panels, screens, mantlepieces, etc., which allows an enormous economy to be made in this kind of work, which is ordinarily so costly. These carvings can also be made after original models, which allows the architect to imprint upon his work his own expression. These products are really very interesting, as they are not hurried over and badly worked. The wood in fact is hard and of good quality and carved and not pressed back. By the process it is possible to obtain a relief of one decimetre or more in the carving. M. BRINCOURT.

INJURIES DURING THE BUILDING OF THE EXHIBITION BUILDINGS AT PARIS. — No inconsiderable amount of blood has been spilled during the erection of the exhibition on the Champ de Mars. It is calculated that 6,350 men were treated for injuries or for illness resulting from exposure; 300 workmen hurt their legs; 260 received severe injuries in the eyes from projecting timbers or bars of iron; 114 were scalded or severely burned, and fifty had their fingers cut off. The deaths from falls are put down at 24, but it is believed that they were far more numerous. — *Pittsburgh Despatch.*



LONDON

THE KNIGHTING OF MR. ARTHUR BLOMFIELD.—THE ARCHITECTURAL ASSOCIATION'S ANNUAL PLAY.—ARCHITECTURE AT THE ACADEMY.—EFFECT OF AMERICAN DRAUGHTSMANSHIP.—ROMAN BATHS.—LIMITING THE HEIGHT OF BUILDINGS.—A SCANDAL AFFECTING MR. ROBSON.

AT last the architectural profession in England has received that national recognition that has long been its due. Amongst the birthday honors conferred by the Queen this year was a knighthood for an architect. Mr. Arthur W. Blomfield, A. R. A., was the lucky recipient. He is Vice-President of the Royal Institute of British Architects, and is distinguished for the very satisfactory way in which he utilizes the early Perpendicular style in his work. He was one of the many children of the late Bishop Blomfield, a former occupant of the see of London. He graduated at Cambridge University, and represents, perhaps, what one might term the academical side of architecture. The more direct cause of his knighthood was some new buildings which he has recently erected at Eton College, upon the site of the old Mathematical School there, and the foundation-stone of which was laid by the Queen the other day in the midst of regal pomp and ceremony. I have had the pleasure of visiting these new buildings, and cannot refrain from expressing a feeling of great disappointment at the character of the work. It is far from being one of Sir Arthur Blomfield's best works; indeed, some of it is distinctly poor and devoid of artistic feeling. Still, Sir Arthur is one of the foremost of our English architects, and has deservedly earned the title which is now his, though its bestowal has aroused no little cavilling here, inasmuch as every one expected that when the tardily-awarded honor of knighthood was bestowed upon an architect it would have been given to Mr. Alfred Waterhouse, R. A., President of the Royal Institute of British Architects, and the recognized head of the profession in Great Britain.

Our students here have been recently celebrating the end of "session" by sundry revels. One of the most interesting was the Architectural Association's *soirée*, which is always looked forward to with great interest in the architectural profession. It nearly always takes the form of a topical play or burlesque, hitting off very neatly the various professional events of the year. The play this session was written by a very clever amateur, Mr. Francis Miller, whose writing was only equalled by the splendid manner in which he took the part of the Bishop of Ipecacuanhaland (a curious anachronism, by the way, seeing that at the date the play was laid the race of colonial bishops was *non est*). Most of the parts were taken by students, one of whom did not disdain to don the airy nothings of a *coryphée*, and the whole entertainment was of a very enjoyable nature. Although no one but students and past students were allowed to attend, the audience numbered over six hundred.

The other "great day" was the ladies' concert of the students' musical society, called the Architectural Association Lyric Club. This was a sort of speech-day, and was attended by a very large and fashionable set of people, including the leaders of the profession. The students' works of the session were exhibited in the rooms of the Royal Institute of British Architects, and the collection showed that much excellent work had been done in the class-rooms during the winter.

The Architectural Room at the Royal Academy contains some very excellent and thoughtful work, though there is no very large building exhibited. Mr. Waterhouse's new Hôtel Metropole on the foreshore at Brighton is, perhaps, the most important edifice on exhibition. Talking of the Academy, I have received a very interesting little publication, called "*Academy Architecture*," which is made up by reproductions of all the important drawings in the Academy, as well as a fair sample of those rejected. The plates are very clear, though a trifle small in scale, and the work, altogether, is quite worth the half-dollar which is asked for it. It can be obtained from Messrs. English & Koch, 69 Chancery Lane, W. C.

One of the points which crossed my mind in looking through the drawings at the Academy was the singular influence of the peculiar and undeniably effective style of draughtsmanship that obtains on your side of the Atlantic, whereby broad spaces are left quite white in the drawing, and brilliant contrasts of black-and-white sought for. By this means a bright, pretty drawing is obtained, but one, I am afraid, which conveys far too favorable an idea of the building. This style of drawing has made its appearance in the Academy this year, I think, for the first time, and it is a mooted question what effect its introduction will have upon English architecture.

Another "trick of the trade," which I do not fancy, I have seen in your drawings, that is to merely commence the central lines in a large group of mouldings, and only run those bounding the group round the full length of the arch. Thus a lot of tedious, difficult work is saved ("shirked," the *Builder* calls it) and an excellent effect obtained. This does not seem a bad idea, only it is now carried to excess, and both perpendicular and horizontal lines are treated in the same way, which, I need scarcely say, tends to produce a very scrappy, careless drawing. I just mention these things as thoughts suggested by a cursory look at the drawings and sketches at this year's Academy.

We have had a contest this year for the presidency of the Architectural Association, for the first time in its history. The successful candidate is Mr. Leonard Stokes, one of the most promising architects of the day, and the majority with which he gained the day is a great triumph to those who look upon the artistic as the all-important side of architecture—*primus inter pares*, in fact.

A very interesting lecture was delivered at the Royal Institute of British Architects the other day by Professor Aitchison, A. R. A., upon the Roman Thermæ—those great buildings wherein the luxuriance of Imperial Rome was particularly *en evidence*. His description of the various buildings teemed with interest; indeed, it is a little difficult at first sight to realize the enormous scale upon which these edifices were constructed. For instance, the Baths of Caracalla are supposed to have been as large as our Houses of Parliament in London, and replete with every convenience for bathing, gymnastics and exercise of every description, while nothing was too precious to be impressed into the service of the decorators. The Professor entered into the vexed question of the original purpose of the Pantheon, and inclined to the opinion that this wonderful building was undoubtedly the laconicum of the Thermæ of Agrippa. This view was subsequently repudiated by the Chairman of the Board of Examiners in Architecture, but the bulk of the evidence seems to be on the side of the Professor.

A bill has been lately introduced into Parliament by Mr. Whitmore for the purpose of limiting the height of buildings. The main idea of the bill is that no building is to be higher than the width of the street on which it abuts. The bill has met with a fairly favorable reception, but it remains to be seen whether it will pass the Parliamentary ordeal, or be included in the "massacre of the innocents" at the conclusion of the session.

The site of the defunct Italian exhibition is occupied this year by the wares of Spain and Portugal. From what one hears, the arrangements have not been very satisfactorily carried out, and it remains to be seen whether it will be a success or not. Of course the architecture of the Peninsula is not to be named in the same breath with that of Italy.

An unpleasant episode has occurred with reference to Mr. E. R. Robson, architect to the Education Department. It appears that Mr. Robson, who is supposed to have a unique knowledge of the wants and requirements of elementary schools, is frequently appointed assessor in competitions for schools. It has been noticed that nearly always, when this was the case, Mr. Charles Bell, a well-known city architect, managed to get the competition, and it now transpires that the competition plans were generally drawn for Mr. Bell by Mr. Robson's head-assistant in his spare time. The matter has been brought before the Council of the Royal Institute of British Architects, where it is to be sincerely hoped satisfactory explanations will be given of the matter. CHIEL.

SAFE BUILDING.[1]—XXX.

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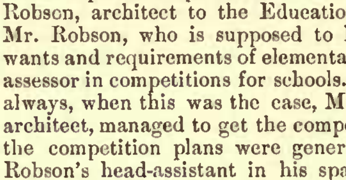


Fig. 160.

System of Piling.

WHEN beams or other rolled-iron shapes are to be rolled the cold muck bars are sheared off to convenient lengths and sufficient of them tied together with wire into bundles to make the desired length of beam or other shape. This is called piling. Usually from five to nine muck bars are piled on top of each other in each bundle.

The details of piling and size of muck bars, of course, vary in different shops.

The Phœnix Iron Company form their pile for beams over nine inches deep very ingeniously, by rolling bars of different shapes, which are keyed and fitted into each other and are driven and held firmly together by wedges, as shown in Figure 160.

The writer believes that there are only a few mills using this method, which is to be regretted, as the advantage of having the grain or joints of the rolled-section longitudinal to each part is very great over the method where the seams run at right angles to the web, as is the case in the ordinary piling.

Rolling out the Piles.

These bundles or piles are put into the fire and heated to an almost white heat. They are then put on barrows or trucks and run as fast as possible to the rolls. These are arranged in pairs or in threes in a long line. The rollers

[1] Continued from page 29, No. 708.

are about eight feet long, the ends supported in cast-iron stanchions (called housings) of tremendous strength, the pressure against them being very great when the iron is forcing its way between two rollers. In "two-high mills" there are two rows of rollers over each other, in "three-high mills" there are three rows of rollers over each other.

Description of Rollers. Each row of rollers revolves in opposite direction to the next row over, the result being that the iron is drawn in and squeezed between them. The roller has cut along its surface grooves which gradually shape the heated mass to its final section. The first set of teeth shape the iron roughly to the shape desired, the next pair come a little nearer to the shape, and so on till the last pair which give it the exact shape; for large sections it sometimes requires two sets of three-high rollers for each piece, but usually one set answers to roughen and finish the piece. Of course the length of the piece increases as its cross-section is diminished by the squeezing process of the rollers. Where the rollers are three-high, the heated bundle or pile is run through the first set of grooves in the lower pair of rollers in one direction; as it comes out on the other side, it is picked up by a pair of tongs (usually manipulated

Process of Rolling. by hand, but by steam when large pieces are being rolled), and carried to the upper pair of rollers, where it runs back through their first pair of grooves but in the opposite direction. It is then carried to the second pair of grooves in the lower rollers where it runs through in the same direction as through the first, then back through the second pair of grooves in the upper rollers and so on to the end. Where the mill is only two high the rolling is all done in the same direction, the iron being run back over the upper roll, its friction on and the turning of the roll facilitating greatly the work of getting it back quickly. The operation of rolling continues during the one heating of the bundle or pile of refined iron, as, of course, the furnaces would not be large enough to re-heat long pieces. The rolling must, therefore, be very rapid, and no delay should take place. The pressure of the rolls is so great that if the mass meets with any obstacle, instead of stopping and wedging in the roll the balance will run on out and curl the piece all up, sometimes even pushing the end up through the roof. When the iron has made its final passage through the rollers and is

Straightening the Pieces. properly shaped in section, it usually is all curled up lengthways in both directions. It is still at a cherry red heat and is, therefore (after having the defective parts at the ends cut off by a circular saw), either run onto or quickly carried by a gang of men and placed lengthwise across a long series of skids or rollers. At the other ends of these skids are iron upright stops. A gang of men armed with heavy wooden mauls or mallets belabor the flat side of the section its entire length till it touches the skids at every point. They now move it over against the stops and belabor the short edge or flat side of flange, till the flat side of the other flange touches the stops at every point. This, of course, straightens the beam or other section lengthwise in both directions. It is now allowed to cool and is ready to sell for use. Plate-iron is straightened as above. Beams and channels are straightened cold by being run through a gag press. Angles are straightened cold by running through straightening rolls.

Single Refined-Iron. Iron rolled as above is the ordinary rolled-iron of commerce and is known as merchantable or "single refined-iron."

For better qualities the muck bars are heated and rolled into plates of single refined-iron. When forming the bundle or pile the top and bottom layers consist of the single refined plates, the inter-

Extra Refined-Iron. mediate layers being muck bars. Or the top, bottom and centre layers are of single refined-iron plates, the other layers being muck bars. This is generally known as "extra refined-iron" and a small advance charged over single refined-iron.

For the best work *all* the layers in the pile or bundle are made of

Double Refined-Iron. single refined plates, no muck bars at all being used. This is known as "double refined-iron" and a considerable extra price is charged for it over the cost of single refined-iron.

For very important tension-members in trusses or arches, or for important hangers it is very desirable to use the double refined-iron. But, as a rule, the best results will be obtained by being satisfied with whatever kind of iron the mill is accustomed to roll. It stands to reason that a mill will not upset its regular shop practice and line of work for a single order unless well paid for it, so that, as a rule, it is more speedy and more economical to take their regular iron and use a larger size of cross-section. Then, too, where double refined-iron is ordered, the most constant supervision will be needed to get it. The men will probably prefer to relapse into their regular ways even if the principals do not. Then, too, in a report to the Government of a large series of experiments made at many mills and tested at the Watertown Arsenal, it was found that the result of the double refining was harmful at times, and that its value depended entirely upon the nature of the muck bar.

Where the muck bar was of a decidedly poor quality, showed air

Result of Several Rollings. holes, blisters, and a general crystalline appearance on fracture, or spluttered greatly while being run through the rotary squeezer or the steam-hammer, denoting the presence of much slag and impurities, that is, when the quality of the muck bar resembled that of a dirty and poor cast-iron, the double refining was of great service in adding strength to the material. Where, however, the muck bar was of a good quality, the puddle ball spluttering but little in the rotary squeezer or in the steam-hammer, and the muck bar itself showing on fracture a goodly part of fibrous section and the balance with but little impurities, the double refining was found to positively injure and weaken the iron, to dry it up, as it were, leaving the successive layers distinctly visible, when the iron is tested by eating away its edge with muriatic acid, or in circular pieces distinctly showing and opening the successive layers on fracture. This in the case of double refining of poor-quality muck bars was not nearly so marked.

It concludes, therefore, that some impurities help to amalgamate the final layers, and that where the muck bar is already of a partly wrought-iron nature — partly fibrous on fracture — that double refining works an injury. For important work, therefore, there should be a constant mill supervision by an inspector stationed there for that purpose, and the question of double refining or not should be left for decision to tests made on the premises.

Extra refined-iron, however, can safely be used at all times, the only drawback being its additional cost, and the doubts whether it will be furnished as specified unless the work is closely watched and inspected.

Instead of using muck bars to make up the bundles for the final

Use of Old Iron. heating, the mills sometimes use the cut off and otherwise waste ends of beams and other rolled-iron; there is no objection to this if the iron is not too dry, but, as a rule, it is a very good practice, as the iron thus gets an extra rolling or double refining. Nor is there any other objection than above to the use of old rails, beams, or scrap iron, provided always that all such material is free from all rust and is thoroughly cleaned; where mixed with muck bars, and thoroughly cleaned, and perfectly welded, it is greatly to be recommended.

The frequent rolling of English iron within a reasonable limit, according to Sir W. Fairbairn, improves its quality and strength; if, however, it is rolled too often, re-heated more than five times, he says it quickly loses its strength.

Pure iron, that is, iron [*practically*] free from carbon, consists

Effect of Rolling. when heated to a white heat of a mass of crystals of cubical form. The effect of rolling is to elongate these cubical crystals into long silky fibres which interlace and bind themselves together and form the mass of all good wrought-iron. A repeated sudden shock or blow, when cold, or continuous heavy vibrations, tends to restore the fibres to their original form, that is, crystallize them, the iron becoming very brittle and weak. It is for this reason, in testing wrought-iron, that if it shows crystalline specks on fracture, it is considered to be of a poor quality, provided of course the fracture has not been made by sudden blows; if, however, the broken section is entirely fibrous the nature of the wrought-iron is correct and considered good. If wrought-iron contains sulphur it is "red short," or cold short and difficult to roll.

Wrought-iron is usually sold by the yard in length, that is, each

Why sold per yard. section is known by its weight per yard. The reason of this is that the weight in pounds of a section of wrought-iron one yard long is exactly ten times its area of cross-section in square inches. One-tenth of the weight per yard in pounds is then the area of cross-section in square inches.

In the above the writer has purposely used the words "wrought"

Nature of Wrought and Rolled Iron Similar. and "rolled" iron interchangeably. They are really the same thing. Their nature is supposed to be exactly identical. If any distinction can be drawn, it would be that in rolled-iron the elongated fibres are formed by rolling, while in wrought-iron they are formed by hammering, either by hand or machinery.

For large sections, rolling is to be preferred; but for small sections, hammering by hand is generally preferable; this latter is frequently also known as forged-iron. Welding is the process of heating two separate pieces of iron and uniting them together, while hot, by hammering or forging. The fibres of the two parts interlacing and forming a joint nearly as strong as the material. Any iron that can be forged, rolled or welded is called malleable.

There is a quality of iron known as malleable cast-iron, which com-

Malleable Cast-Iron. bines the qualities of both wrought and cast iron, being cast-iron of a semi-wrought-iron character, which can be forged. The forging, however, has to be done *cold*, not hot, as with wrought-iron. The process is described as embedding cast-iron in powdered hæmatite ore or in scales of oxide of iron, or other oxides, and raising it to a bright red heat in an annealing oven. Pieces of cast-iron not over one-half inch thick can be made entirely malleable by this process; with thicker pieces, however, it is only possible to render the outside skin malleable to a depth of about one-quarter inch, the depth, of course, depending on the length of treatment, the interior retaining its unaltered cast-iron character.

The manufacture of steel is still in its infancy, and as a result

Manufacture of Steel. great uncertainty attends the results obtained. Nor have the different methods of manufacture been tested sufficiently long to definitely establish the superiority of either.

It is partly for this reason, and also on account of the many different kinds of steel produced — dependent on the varying amount of carbon it contains — that there are so many radically different processes of manufacture.

As already remarked, steel in its chemical composition is the intermedi te between wrought and cast iron — wrought-iron being theoretically free from carbon, while cast-iron has ordinarily a good

deal more carbon than steel and *holds it in a different form.* Steel with but little carbon is called "mild steel," with much carbon "hard steel," the former being the more reliable of the two. It should be noted, however, that whereas in the earlier stages of the manufacture of steel its chemical synthesis was made the criterion, yet to-day the oft-mooted question as to whether a certain product is iron or steel is more often determined by reference to its physical characteristics than to its analysis. The physical characteristic of steel is that it may be *cast* into wholly malleable ingots, that is, the *cast* ingot or lump can be rolled or forged in its heated state without any intermediate process. This is not true as regards cast or pig iron which is entirely non-malleable, while, on the other hand, wrought-iron cannot be cast, not being fusible at temperatures obtaining in the arts.

Characteristic of Steel.

The great importance and future of steel lies in the above property as also in its large tensile strength, its great elasticity, its hardness, and its further advantages of being capable of "hardening" and of taking a "temper." It combines within one metal the ductility and weldability of wrought-iron with the hardness and fusibility of cast-iron, and this with an elasticity and tensile strength greater than those of wrought-iron.

Hardening Steel.

Hardening consists in raising the steel to a red heat and suddenly cooling it in water; this greatly hardens steel but does not effect wrought-iron, while cast-iron would fly to pieces under such treatment. Hardened steel can be softened by tempering, this is done by re-heating the hardened steel, but to a *lower* temperature than before, and again cooling it, but slowly, when it will be tempered or softened.

Steel rolled colder than Iron.

Steel retains magnetism greatly. When struck, steel rings out a sharper metallic sound than iron, but in physical appearance it often resembles wrought-iron to such a degree that even practical iron-masters are not able to distinguish between them by merely looking at their fractured parts. Steel is malleable at a lower heat than wrought-iron, and for this, and other reasons, but principally on account of the danger of "burning" it, — it is usually rolled at a much lower temperature than wrought-iron; being, as a result, much more solid, that is, further from the melting point, than is iron when passing through the rolls, it requires very much greater power and heavier machinery than the latter.

Direct Process.

The production of steel direct from the ore is perfectly feasible, but has not yet attained to any relative commercial importance, if we except the process recently employed and improved by the Carbon Iron Co., of Pittsburgh, Pa. This company have lately produced steel of extraordinary quality at a comparatively reasonable cost by a process approximately described as puddling a certain kind of iron ore with graphite. It is not likely, however, at this writing, principally on account of the cost of manufacture, that this product will find its use outside of the demand for tool-steel, boiler (flange and fire-box) steel, and such other high grades of necessarily limited consumption as compared with rail or structural steel.

Two Principal Methods.

All the different processes of manufacturing steel really narrow down to the two principal methods of either the addition of a certain percentage of carbon to pure or malleable iron, or the removal of part of the carbon from pig-iron. To give all the variations practised in these two principal methods would be impossible here, but under the first method we can cite the cementation process or the manufacture of the commercial "cast" steel; as an intermediate process the "Open Hearth" processes; and under the second method the well-known "Bessemer" process.

Cast-steel.

Of these, in its main features the Cementation process is the oldest. Briefly, bars of wrought-iron are packed in charcoal in air-tight retorts or "pots" and subjected to a white heat for over a week's time. The wrought-iron absorbs the carbon or alloys with it, showing a blistered appearance — whence the name of "blister" steel — and becomes readily fusible.

These blister steel bars when piled and rolled once constitute the "single" shear steel of commerce, or if re-piled and re-rolled the "double" shear steel. If, however, they are broken up and melted in a crucible and cast into an ingot which is re-rolled, the quality and uniformity of the product are much improved and it is known as "cast" steel; the principal use of which is for cutlery and edge tools. Cast-steel is the hardest, strongest and densest steel made, but when raised beyond a red heat becomes so brittle that it cannot be forged. It cannot be welded and flies to pieces under a powerful blow.

Open Hearth Process.

The *Open Hearth* process may be justly regarded as the intermediate process because it is either the carbonization of or adding of carbon to wrought-iron, or the decarbonization of or removal of carbon from pig-iron, both reactions usually existing in one and the same heat, as in the best known *Siemens-Martin* process, which is a typical and probably one of the best open-hearth methods to-day.

It consists of melting a combination of irons in a basin-shaped hearth under a reverberatory roof by playing on them what is really a blowpipe with a flame oxidizing (removing carbon) from the mass; or reducing it (adding carbon) at will (but usually oxidizing). The combination consists of pig-iron and wrought scrap-iron or old steel rails, or else of pig-iron and iron ore, or sometimes a combination of all the above; when melted down, the one with or in the other, the mass is stirred about to render the mixture homogeneous, and after preliminary testing of samples, is duly poured into ingot moulds. Thus the cast-iron gives up its excess of carbon to the rest of the charge having less or none, and the resultant product, which can be controlled with a nicety that is surprising, is a steel of high grade, with carbon between limits that are well governed from the start to the close of the conversion. The ingots are allowed to cool and are then sold to mills not owning steel furnaces, who, of course, have to re-heat the ingots before rolling them. Where a mill manufactures its own ingots, however, the hot ingot is run directly to the blooming mill and rolled into "blooms" while still hot.

Condition known by tests.

LOUIS DECOPPET BERG.

[To be continued.]

BUILDING LAW

THE EMPLOYERS' LIABILITY ACT.

WE have several times called attention to the possibility that this Act has fastened a new liability for accidents on builders employing architects. The Act was intended mainly to cover cases of contractors; but the question is raised whether in view of certain nearly uniform practices among the architects of Boston, it is not broad enough, to make the owner equally liable with the contractor for a large part of the claims arising under it. It is, for instance, customary, though by no means essential to the proper superintendence of a building contract, to give the architect power to control and direct the operations; and the provision that all material delivered on the premises at once becomes the property of the owner is equally common. Where, by the terms of the contract, the architect is to have the direction and control of the works, it would seem a fair argument, at least, that he was a person entrusted "with the duty of seeing that they were in proper condition"; and the Act is thought by some to make the owner liable in such cases for all accidents that take place by reason of any negligence on the part of the architect, which, of course, is a question of fact for the jury.

The provision commonly found in building contracts that all material shall become the property of the owner as soon as delivered on the premises is also dangerous; for, as is well known, the scaffolding and other ways are usually constructed by the contractor out of lumber delivered on the premises. The property in the scaffolding under such a clause is evidently in the owner; and the Employers' Liability Act makes the owner responsible under certain conditions for "defects in the ways, works, machinery or plant if they are his property."

That the suggestion of the dangerous character of these provisions was well-founded is shown by the fact that already two suits have been begun in Boston, in which the claim is made that the accident took place by reason of a defect in a scaffolding made of lumber which was the property of the owner. The Employers' Liability Act is not in full operation quite yet, and thus far comparatively few suits have been brought to take advantage of its provisions. It is significant, therefore, that notwithstanding the small total of such actions now pending in this county, two should be brought against the owner rather than the contractor.

The way to avoid this danger, or, rather, to reduce it to a minimum — for the risk of suits for accidents can never be wholly avoided — is to adopt a practice that had been resorted to by some lawyers even before the passage of the Employers' Liability Act:

1. Give the architect the fullest powers to *reject* any work which appears to him defective; but carefully provide that he shall have no control or direction; that is, draw the contract so that he cannot say how the work shall be done, but if it is not done satisfactorily can order it taken down and done over again. In practice such a provision works in about the same way as the usual clause, giving the architect full powers of direction; the contractor, if he honestly intends to live up to the terms of his contract, will avoid doing what he knows the architect will condemn; and if an accident takes place and litigation arises in which it is sought to prove that the architect gave the directions which led to the accident, the owner will be very thankful that his contract withheld from the architect all authority to give such directions on his behalf.

2. As to the ownership of materials delivered on the premises: instead of providing that these become the property of the owner at once, limit the operation of this clause to materials intended for permanent incorporation into the building, and provide that all scaffolding, apparatus, ways, works, machinery and plant brought upon the premises by the contractor or used by him shall be and remain his property. If it is thought wise to provide that in case of the builder's insolvency the owner shall have the right to use the scaffolding, machinery, etc., that can be accomplished by suitable provisions.

If the plaintiffs in the two cases referred to above should succeed in fastening a liability on the owner by reason of his ownership of the scaffolding, the terrors of house-building will be increased, and the lot of the owner made more unhappy than it proverbially has been in the past.

Pending the decision of these cases, it will certainly be prudent to

alter the customary clauses relating to the architect's control and to property in the materials, in the manner indicated.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

PUBLISHERS AND ARCHITECTS.

PORTLAND, OREGON, July 17, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Recently we sent a local journal the original drawings of a building at their request and at some inconvenience to ourselves and requested them to place our name under the cut of the building or in some way give us credit for the same, they did so, but to our surprise charged us $20.00 for the same, we paid the bill and at the same time made the statement that you never made any charge for cuts or name of architect. In the course of a debate that followed the publisher made the statement that if such was the fact that he would insert our card for ten years in his journal and place our name under every building of ours that he published. We enclose our reply to him and desire you to answer more fully. Trusting that we are not putting you to too great an inconvenience and looking for an early reply we beg leave to remain,

Very respectfully yours, X. & Y.

[*Exhibit* "*A.*"]

PORTLAND, OREGON, July 3, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In case we send you an exceedingly meritorious photograph of one of our late stone residences, would it cost us a cent if you produced the same in one of your photogravure plates? An early reply will greatly oblige,

Yours very respectfully, X. & Y.

[*Exhibit* "*B.*"]

BOSTON, MASS., July 10, 1889.

MESSRS. X. & Y.,
Portland, O.:

Dear Sirs, — In answer to your question of July 3, we will say that contributors of designs accepted for publication in the *American Architect* are subjected to no expense in the matter.

Very truly yours, EDS. AMERICAN ARCHITECT.

Respectfully submitted by X. & Y.

We suppose that you will fulfil your agreement to publish our card for ten years without charge, and place our firm name under all work you publish that comes out of this office free of expense to us, which you stated you would do if the American Architect published fine cuts for nothing.

[*Exhibit* "*C.*"]

PORTLAND, O., July 17, 1889.

TO MESSRS. X. & Y.:

Dear Sirs,— In reply to enclosed, wish to say that I will stand by my original proposition: Whenever I see any of *your* work published in *American Architect* without you having furnished the cut I shall be glad forever after to have your name appear on any building that we publish of which you may be the architect. The very wording of *American Architect* gives the snap (so to say) away. It shows there is a wheel within a wheel. However, I shall publish your name after any of your work has appeared, as I do not go back on what I say. Respectfully, Q. R. S.

[*Exhibit* "*D.*"]

PORTLAND, O., July 17, 1889.

MR. Q. R. S:

Dear Sirs, — Yours of to-day to hand and contents noted. We are particularly struck with the underscoring of the word "*your*" in your letter. We have been under the impression that you represented your journal as being none but a first-class one in every respect, both as to illustrations and reading matter, but the fact of your continual publication of cuts of our buildings, since you state that they have, or rather intimate the same thing, no merit, leads us to believe that you could not have been sincere in your statements, as to the merits of your journal. Your agreement was not to the effect as to our work being published (we had been led to believe that our work had some merits from the fact of your publishing it), but if any architect's work was published, free of charge, both as to cut and name. We have enclosed your reply with a letter of our own to the *American Architect*, asking them to enlighten you more fully, and await their reply before answering you more fully.

Very respectfully yours, X. & Y.

[IT does not seem to us necessary to add anything to this excessively amusing correspondence. Our Western contemporary seems to discover a world of hidden meaning in our own simple statement, but the hiding place is so snug that we doubt if any other can detect it. — EDS. AMERICAN ARCHITECT.]

WANTED, A TRAVELLING COMPANION.

ANNISTON, ALA., July 11, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I expect to take a trip to Europe to see the Paris Exposition and something of the large cities of Europe about the 1st of September, and write to ask you if you know of any young architect or draughtsman that contemplates such a trip about that time. I would like to have some congenial companion, and, as I have been disappointed by one of my friends here, write to ask if you know of any gentleman going over about that time, and, also, to ask your advice as regards places of interest to visit, etc. I am somewhat limited in time (about ten weeks) and also in money, but will have enough to enjoy myself on. I should like to open a correspondence with any gentleman that you think may go over, and believe that two of us can travel much cheaper than one, and also learn a great deal more too.

I am sorry to bother you with these questions, etc., but some day I may be able to return all your kindness by contributions of interest. Respectfully, VOYAGER.

[IT will give us pleasure to put in communication with our correspondent any architect who would like to join forces and purses with him for such a trip. — EDS. AMERICAN ARCHITECT.]

PFEIFFER'S AMERICAN MANSIONS.

MONTREAL, CAN., July 16, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I suppose you did not forget that I filed in due time my adhesion to your idea of publishing the work of the late Carl Pfeiffer. I would be sorry if you could not find among the architects on your side of the line a sufficient number of subscribers to justify the publication of a work which, I doubt not, must be interesting to the whole profession. Should it not be only a *question d'honneur* that not a single architect proud of his lasting reputation should neglect to pay such a slight tribute to an honored *confrère*.

I remain, sir, your obedient servant,

JAS. VENNE, *Architect*.

[WE are extremely obliged to Mr. Venne for raising just this point, for it is one against our raising which there were certain reasons. Up to the present time a very small portion of possible subscribers have sent in their names, and, consequently, the returns to the beneficiaries are likely to be unworthily meagre. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

ACOUSTIC PROPERTIES OF SOME BUILDINGS. — There are some buildings which are so utterly bad from an acoustic point-of-view that even experienced speakers are little better off than novices. The House of Lords has, or used to have, an unenviable reputation in this respect. A story is told of the late Lord Lyttelton that, after exhausting his voice in vain efforts to make his brother peers hear a motion which he wished to propose, he, in despair, wrote it down and asked the clerk at the table to read it out. That functionary, however, was quite unable to decipher the writing, and Lord Lyttelton complained that he was cut off from communication with his fellows. Science has not always been successful in coping with the acoustic difficulty. In 1848, it was so difficult for speakers to make themselves heard in the French Chamber that a committee, consisting of the leading scientific luminaries of the day — such as Arago, Babinet, Dumas (the chemist, not the author of "*The Three Musketeers*"), Becquerel, Chevreul (the centenarian who died the other day), Pouillet, Regnault and Duhamel — was appointed to study the case and suggest a remedy. After numerous experiments they hit on a contrivance, designed on the most scientific principles, which was to make the orator's voice ring like a clarion to the farthest benches. The last state of the speaker, however, was worse than the first: he felt as if his voice was stifled under a huge nightcap, and the highly scientific sound-reflector had to be discarded as a failure. Indeed, modern public buildings are so often defective in this respect that I am not surprised to find M. C. Garnier, who designed the Grand Opéra in Paris, exclaiming dolefully: "The science of theatrical acoustics is still in its infancy, and the result in any given case is uncertain." So impressed is he with the shortcomings of modern architecture as regards the conveyance of sound, that he frankly confesses that, in the construction of the Opera House, he "had no guide, adopted no principle, based his design on no theory"; he simply left the acoustic properties of the building to chance. The result has not been altogether satisfactory, though it has been no worse than in many other buildings where the architect did his best to make the acoustic conditions perfect. One of the most remarkable buildings from the acoustic point-of-view that I have ever seen is the beehive-shaped Temple in Salt Lake City. It holds from 12,000 to 14,000 people, and one can literally hear a pin drop. When I was in the Temple with some travellers in 1882, the functionary corresponding to the verger of ordinary churches stood at the farthest end and dropped a pin into his hat. The sound of its fall was most distinctly audible to all present. The scratching of the pin against the side of the hat was also plainly heard across the whole breadth of the building. The Temple was designed by Brigham Young, who professed to have

been directly inspired by the Almighty in the matter, as he knew nothing of acoustics. The resonance of the building is so loud that branches of trees have to be suspended from the ceiling in several places in order to diminish it. It is likely enough that Brigham Young's inspiration had a not very recondite and purely terrestrial source, for his beehive is only a slight modification of the whispering-gallery in St. Paul's. The bad acoustic properties of buildings may be remedied by what doctors call "palliative treatment." Charles Dickens's experience as a public reader made him a man of ready resource in meeting such difficulties. On one occasion, when he was going to lecture at Leeds, Mr. Edmund Yates, who had spoken in the same hall the evening before, sent him word that the acoustic conditions of the place were very bad. Dickens at once telegraphed instructions that curtains should be hung round the walls at the back of the gallery; by this means he was able to make himself more easily heard. — *The Contemporary Review.*

The Tomb of Alexander. — When I remember the doubts I entertained as to the value of the works that were heralded into the world as belonging to the tomb of Alexander, I can thoroughly sympathize with the sceptical attitude maintained by archæologists here towards the discoveries of Sidon. I have recently been at Constantinople, and have been shown the photographs of the sarcophagi by Hamdy Bey. I think it right to record my conviction that the discovery seems to me one of the most important made in this century. Nay, I venture to believe that, excepting the Elgin marbles and the Hermes of Praxiteles at Olympia, no works of ancient Greek art have been found of greater artistic interest and merit. There are several sarcophagi of various dates, showing an interesting development of tombs of the Lycian type, some reminding us of the monuments from Xanthos in the British Museum. But there is one of supreme beauty, with pediments containing reliefs, on which the polychromatic additions are wonderfully preserved. These reliefs are unique in character. In style they remind us of the friezes from the mausoleum of Halicarnassus, and can hardly be later than the beginning of the third century, B. C. The subject of one pediment, which contains a representation of a lion hunt, is quite clear, inasmuch as it has an undoubted portrait of Alexander. Now, when we remember that, according to Pliny and Plutarch, a group at Delphi representing the famous lion hunt of Alexander is attributed to Lysippus and Leochres, it is highly probable that some relation subsists between this relief and the bronze group at Delphi. There are also analogies between this group and the famous Neapolitan mosaic. If I remember rightly, a head on the right in this relief reproduces the head on the gold stater of Philip. The other pediment, also containing a portrait of Alexander, represents the execution of some warrior or prisoner. I do not venture at present to offer an interpretation of this. Hamdy Bey does not assert positively that this is the tomb of Alexander, but I feel that he will be justified in pointing to the possibility of such being the case. My acquaintance with the works is merely based upon the photographs. The works themselves are in cases at Constantinople, awaiting the completion of the museum which is being built to house them. We may also hope that, before long, Hamdy Bey's publication of these works will make them properly known to the public. Meanwhile I feel assured that he has done all in his power to act in the interest of science. That he desires to preserve them for his country is a patriotic feeling with which all patriotic men will, or ought to, sympathize. — *Charles Waldstein, in London Athenæum.*

Comparative Strength of Steel and Iron. — The substitution for bolts, nuts, bars, plates, etc., of a tough, soft, manganese steel, in place of iron, was sometime since proposed. Recently, tests of a severe and decisive character have been made, with a view to ascertain whether bolts of such material are really strong and reliable as against the very heavy stresses and strains to which they are sometimes subject, and to determine whether the steel of which they are made would withstand bending, hammering close, and rough treatment in various ways, or whether such steel would only withstand heavy stresses slowly applied. Under these trials the metal is found to exhibit a toughness unsurpassed by any other, being easily nicked and bent round away from and close up at the nick. Bolts up to five-eighths inch were tested by holding the nut fast in a vise, and then hammering the bolt until it was bent downward at the screwed part through an angle of 130 degrees, then taken out and doubled down and closed up with a heavy hammer on an anvil; but though the screw-threads were thus jammed up and compressed upon each other on the inside of the bend, and opened out to double their pitch on the outside, the steel did not break. — *Exchange.*

A Subterranean Canal. — The strangest canal in the world is one I never saw mentioned in any book or newspaper. It is a canal sixteen miles long, between Worsley and St. Helens, in the north of England, and is underground from end to end. In Lancashire the coal mines are very extensive, half the country being undermined, and many years ago the Duke of Bridgewater's managers thought they could save money by transporting the coal underground, instead of on the surface. So the canal was constructed, the mines connected and drained at the same time. Ordinary canal-boats are used, but the power is furnished by men. On the roof of the tunnel-arch are cross-pieces, and the men who do the work of propulsion lie on their backs on the coal, and push with their feet aga nst the cross-bars on the roof. Six or eight men will draw a train of four or five boats, and, as there are two divisions in the tunnel, boats pass each other without difficulty. — *St. Louis Globe-Democrat.*

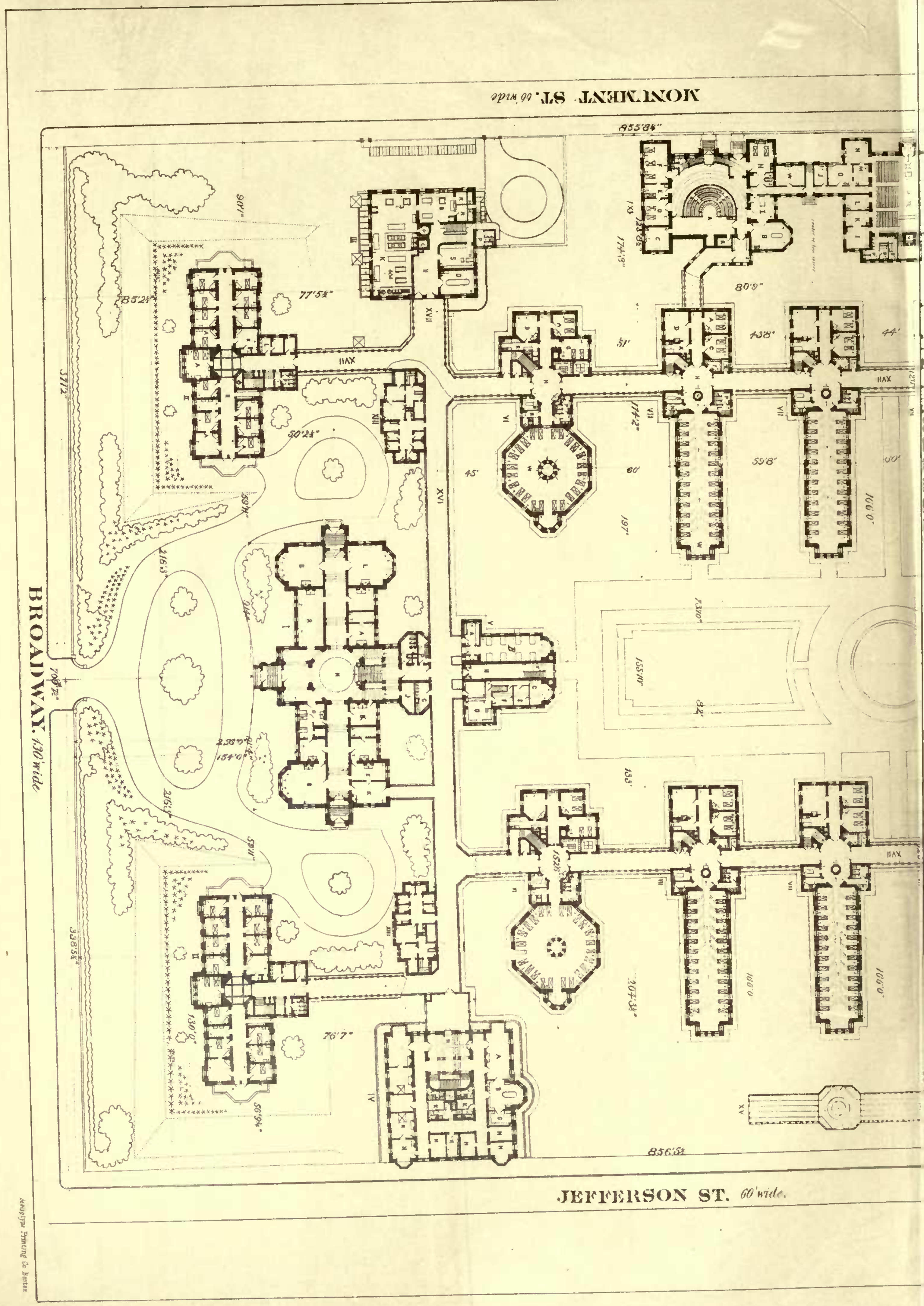
Government Rights in Navigable Water. — On June 4, in the Circuit Court of the United States, the right of the United States to lands at the bottom of the navigable waters in the several States, for a lighthouse site or other purposes connected with commerce, was decided. Judge Morris decided that under the commercial clause of the Constitution giving the General Government the right to regulate commerce, the United States has the paramount title to the bottom ground of all navigable waters in the States, and may take possession of such ground for purposes of commercial protection, development and regulation, without condemnation or compensation. — *Exchange.*

TRADE SURVEYS

The extraordinary production of and accumulation of wealth during the past twenty or thirty years has begun to overflow its banks and rush into the open country in the shape of trusts, syndicates and combinations of various kinds. The business interests are in a state of transition from individualism, which politically corresponds to the feudalism of past centuries into congregated effort which corresponds politically to the republican form of government existing openly in the United States, and just beneath the surface of society in many other countries. This organization of business interests will gather strength as it goes, and will supplant much of former methods and indirectly control what it does not supplant. While no apology is intended for the tyrannical manifestations of power incident at all times to collective strength, but especially now when the new forces are trying on their first pairs of new boots, the fact might as well be borne in mind that, from an economic standpoint, these new aggregating forces must of necessity in time transform all business methods, rendering possible even a new and different banking system freed from some of the worst defects of the systems invented in Threadneedle Street. No general review of the causes and agencies now at work, or which are likely to be generated soon, will be marched by in dress-parade at this time. The only purpose of a passing allusion is to indicate that there is a mighty factor beneath the surface which will bring its pregnant results in due time to the attention, and more or less unwilling recognition of the commercial and financial world. The month of July has thus far been a very good one. Fully as much business has come to the counting-rooms and brokers' offices, and mill and factory offices as was expected. Much of it slipped in at old prices, as business men were anxious to keep the wheels of trade turning. Some estimate the advance in prices since spring at 5, some at 10 per cent, but, be this as it may, an improvement in prices has set in in many avenues which may or may not be maintained according as general business interests are managed. The building interests have entered upon the last half of the year with renewed zeal. The lumber dealers will close the season, most probably, with less accumulations of stock than last year, even with a great falling off in railroad-building. This year's railroad work so far amounts to about as much as last year. Up to July 1, the steel-rail orders were for 963,530 tons, against 934,587 tons last year, and deliveries, 575,000 tons, against 585,558 tons. The continued agitations and the threatening attitude of prominent lines to each other and the threats of an attack upon the national railway legislation itself, all keep capital that might go into railroads diffident, but perhaps profitably so. English capital is not above brick-yards, and even much smaller interests have been the subject of observation of special experts armed with commissions to spy out some safe field for investment. Without venturing into theorizing, it may be said that while there will always be a class who can live from their investments, the agencies are, in reality, narrowing those opportunities. The great outflow of capital after paying investments is proof of this. Railroad competition has made indiscriminate securities in railway bonds dangerous. The greater the investments and the wider the field of syndicate operations, the more unstable will be the high dividends and the assurance of competency from investments, without some accompanied personal supervision or co-operation. In other words, the dollar with a brain behind it will beat the dollar with a syndicate or trust behind it, but not while we are in the transition state.

The agricultural implement manufacturers and agents have begun to purchase material and supplies quite largely. One party, last week, purchased 800 tons of steel bars and special shapes. A harvesting-machine builder bought 3,000 tons of merchant-bars. Iron users are hurrying in orders for plates and structural iron, and the market was taken by surprise with the announcement of a $6 cut on steel plates. Railroad reports exhibit a steady increase in traffic. Cars are scarce on many roads. The demand for wood-working machinery is once more increasing. American hardware is growing in favor in foreign countries. The exports of agricultural implements for nine months foot up $2 252,000, an increase of $520,000 over same previous fiscal term. In general machinery, the percentage of increase was 28. The exports of same and tools for nine months footed up $1,480,-000, a gain of $300,000 over 1888. The gain in the export value of locomotives was over 50 per cent. Although the total gain in nine months was only $3,000,000 over nine months of the previous fiscal year, it is important and encouraging as an indication of what there is to be accomplished. American agents will learn a great deal at Paris, and they will make that knowledge a starting-point to introduce American manufactured products to nations that know very little of us. The export trade in cereals, petroleum, lumber and cotton will naturally increase, but the most valuable increase will be in products representing a high degree of special skill. Heretofore American manufacturers have been discouraged by the cheaper labor, longer hours, established commercial and financial facilities already established with foreign countries, and by other advantages, but they are now quickly learning how to make what foreign nations want, and how to sell them. The past season has been the best for window-glass production ever known. The production at home was 3,200,000 boxes; importation, 1,250,000 boxes. A new style of glass has been introduced at St. Louis, and the tank system of making glass in immense quantities is giving great satisfaction. Several new glass factories are to be erected. Lake iron-ore sales this year will probably reach $6,500,000, and iron-makers are laying their plans for a very busy winter. Municipalities are now inclined to sell whatever franchises are asked for cash, and, as such a policy promises to lessen the assessments for taxation purposes, it will probably meet with favor. This tendency was lately shown in Chicago when the Standard's request to construct and operate a pipe-line was defeated. With reference to the chronic apprehensions of a giving out of the petroleum surplus, geological authority in Pennsylvania states that the Pennsylvania and Virginia belt of 204 square miles has yielded 340,000,000 barrels, and the estimated future yield is 2,000,000,000 barrels. The yield per square mile for fifteen years has been 1,000,000 barrels. There is now something like 12,000,000 barrels of petroleum in the tanks in Ohio. Oil stocks have been reduced since June 1 from 15,668,331 barrels to 15,258,863 barrels, a decrease of 409,468 barrels. Great enterprise is displayed, so far as blind pushing is concerned, in several other States where oil land exists, but more money is lost than gained. Last week, a twelve-mile pipe-line four inches in diameter was ordered in New York. A great deal of pipe-laying is in contemplation, and both cast and wrought iron pipe-mills are full of orders.

S. J. Parkhill & Co., Printers, Boston.

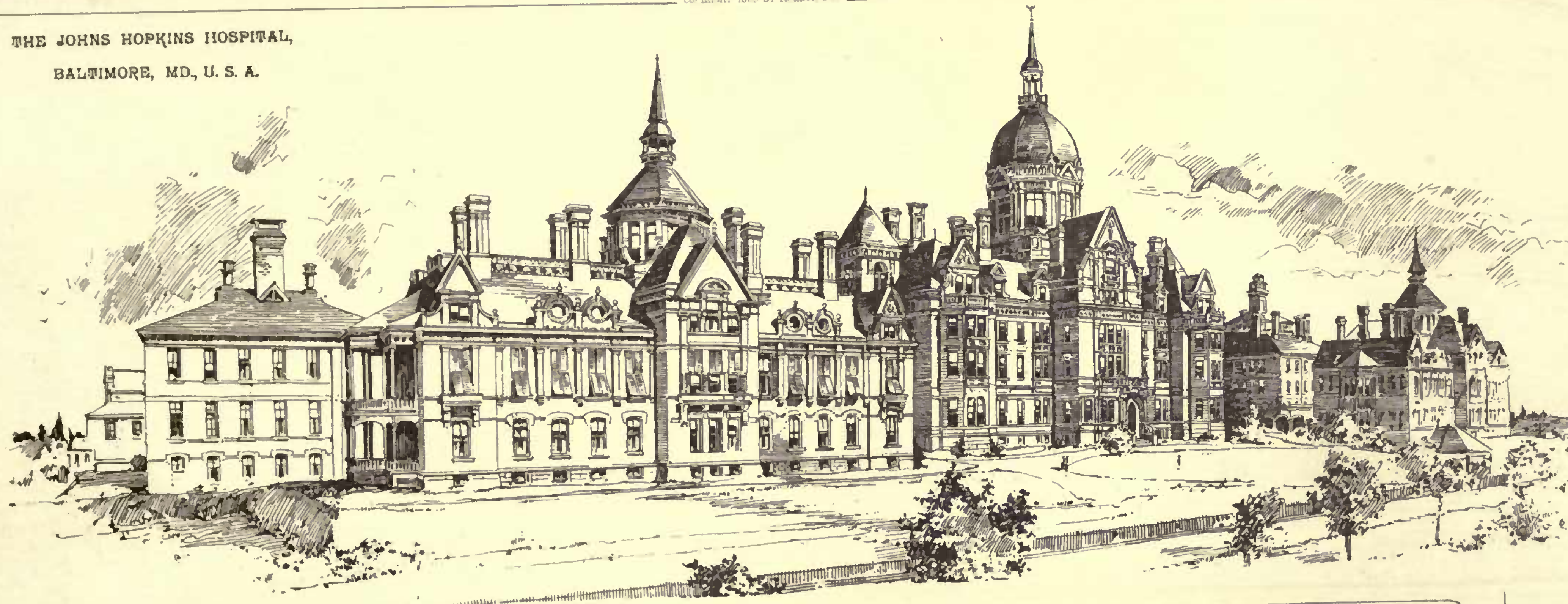

MONUMENT ST. 60' wide
855'6¾"
BROADWAY. 130' wide
JEFFERSON ST. 60' wide.
856'5½"

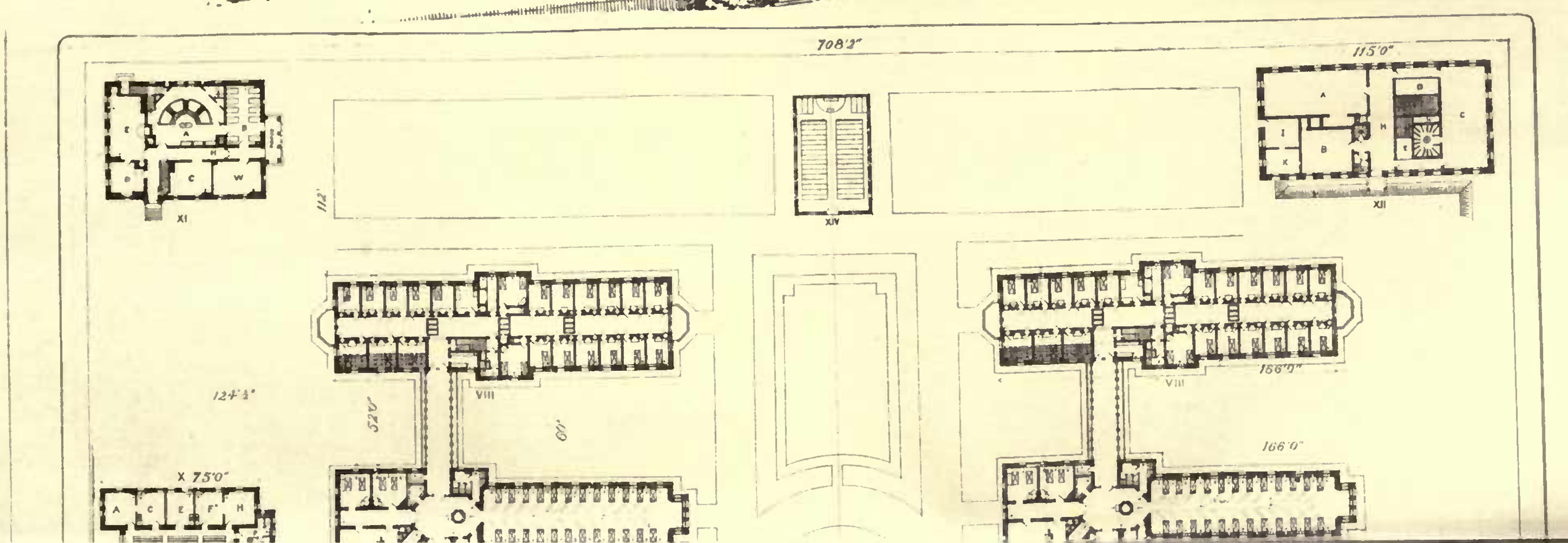
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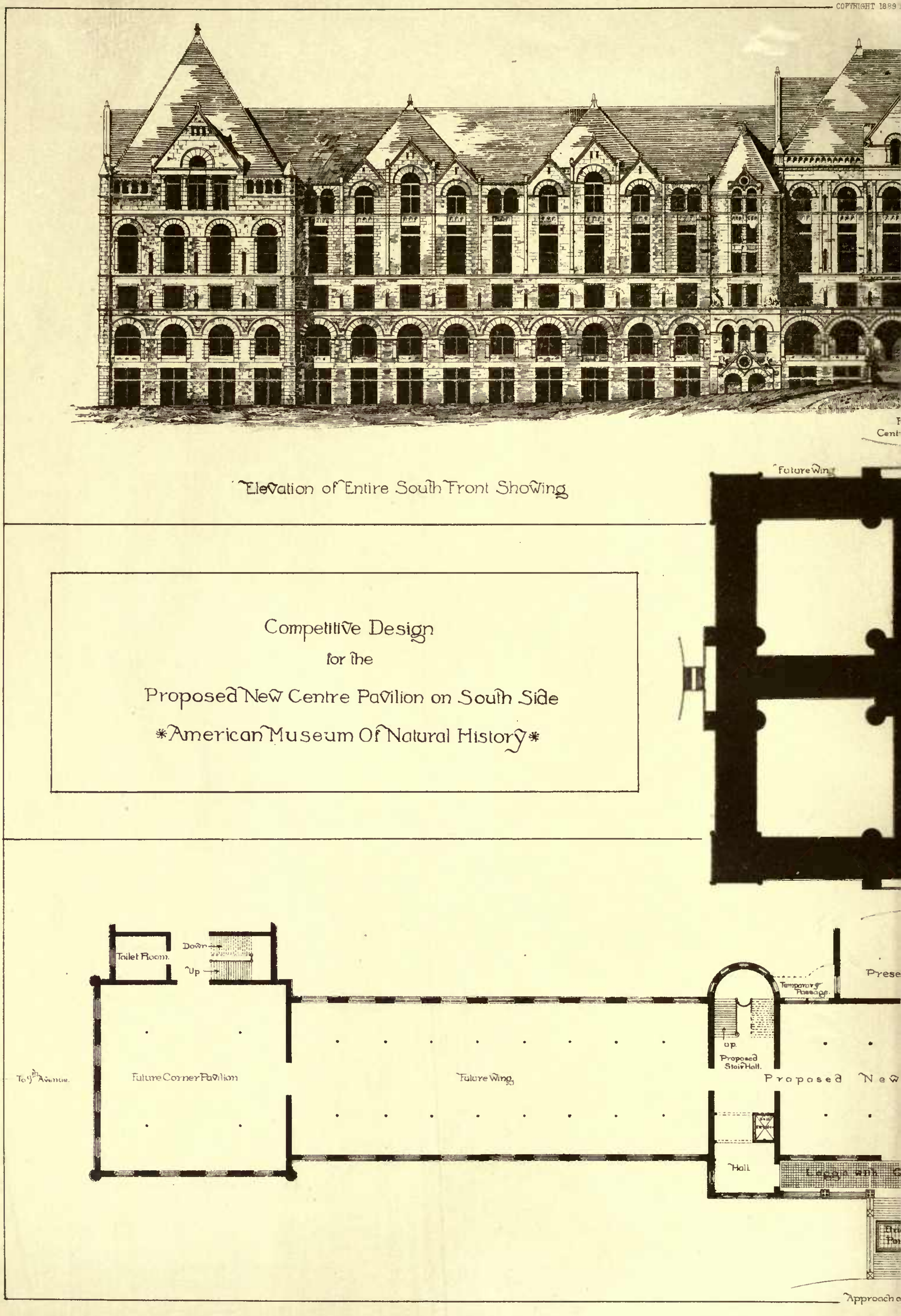
American Architect and Building News, July 27 1889.

THE JOHNS HOPKINS HOSPITAL,

BALTIMORE, MD., U. S. A.





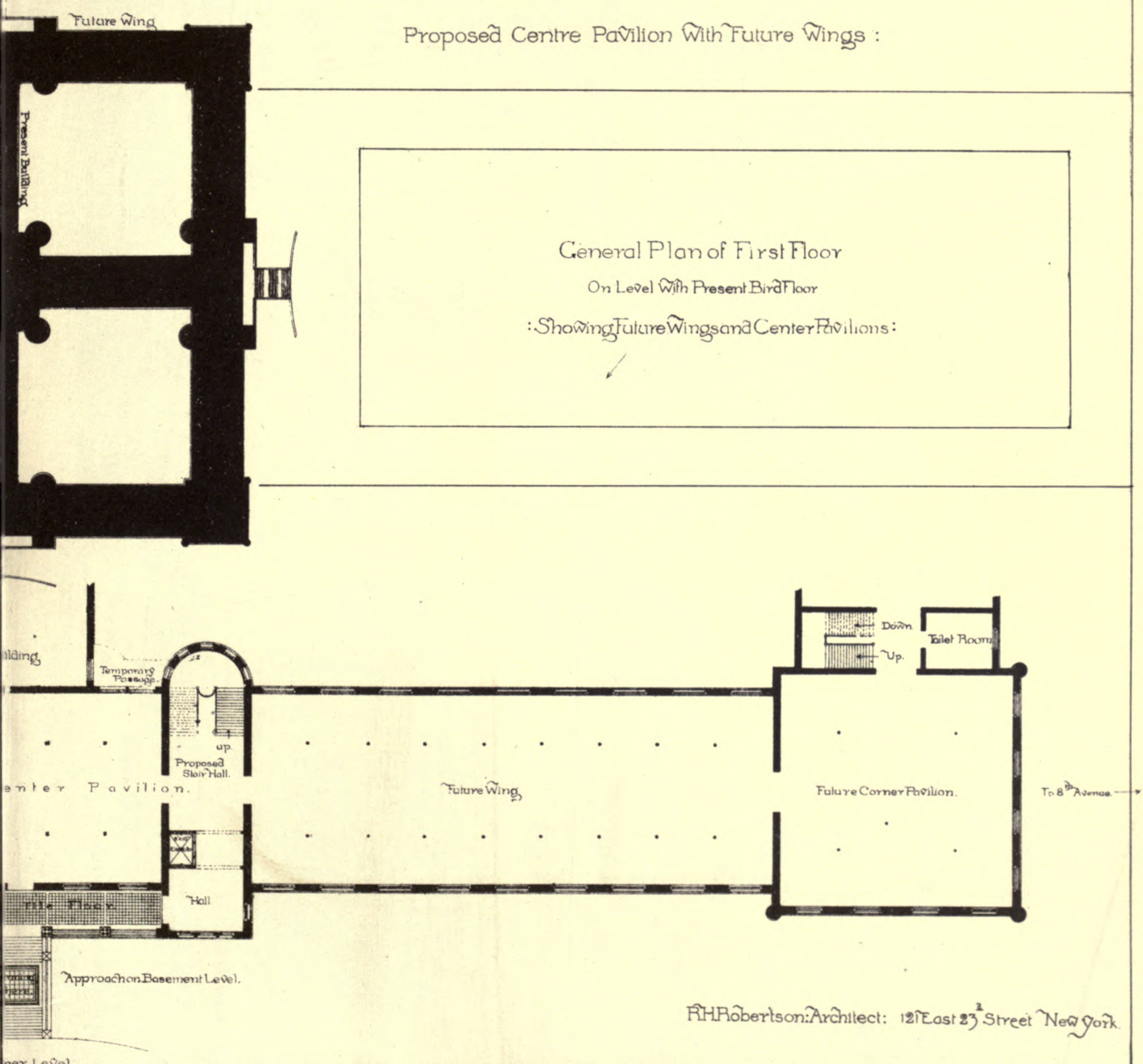


Elevation of Entire South Front Showing
Competitive Design
for the
Proposed New Centre Pavilion on South Side
American Museum Of Natural History
Future Wing
Toilet Room.
Down
Up
To 9th Avenue.
Future Corner Pavilion
Future Wing
Temporary Passage.
Up.
Proposed Stair Hall.
Hall.
Proposed New
Prese

NNOR & Co



Proposed Centre Pavilion With Future Wings :

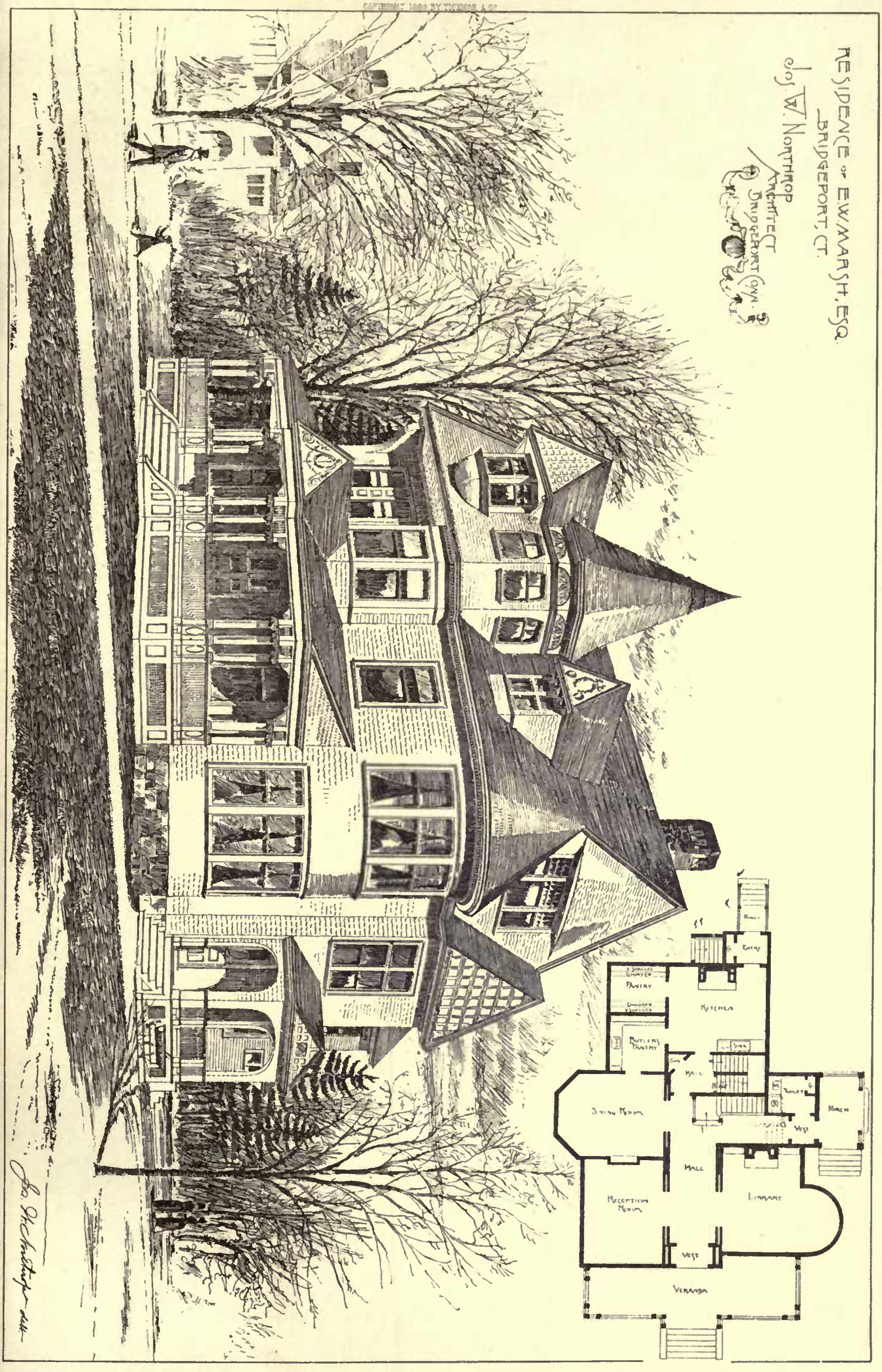


General Plan of First Floor

On Level With Present Bird Floor

:Showing Future Wings and Center Pavilions:

R.H. Robertson: Architect: 121 East 23d Street New York.



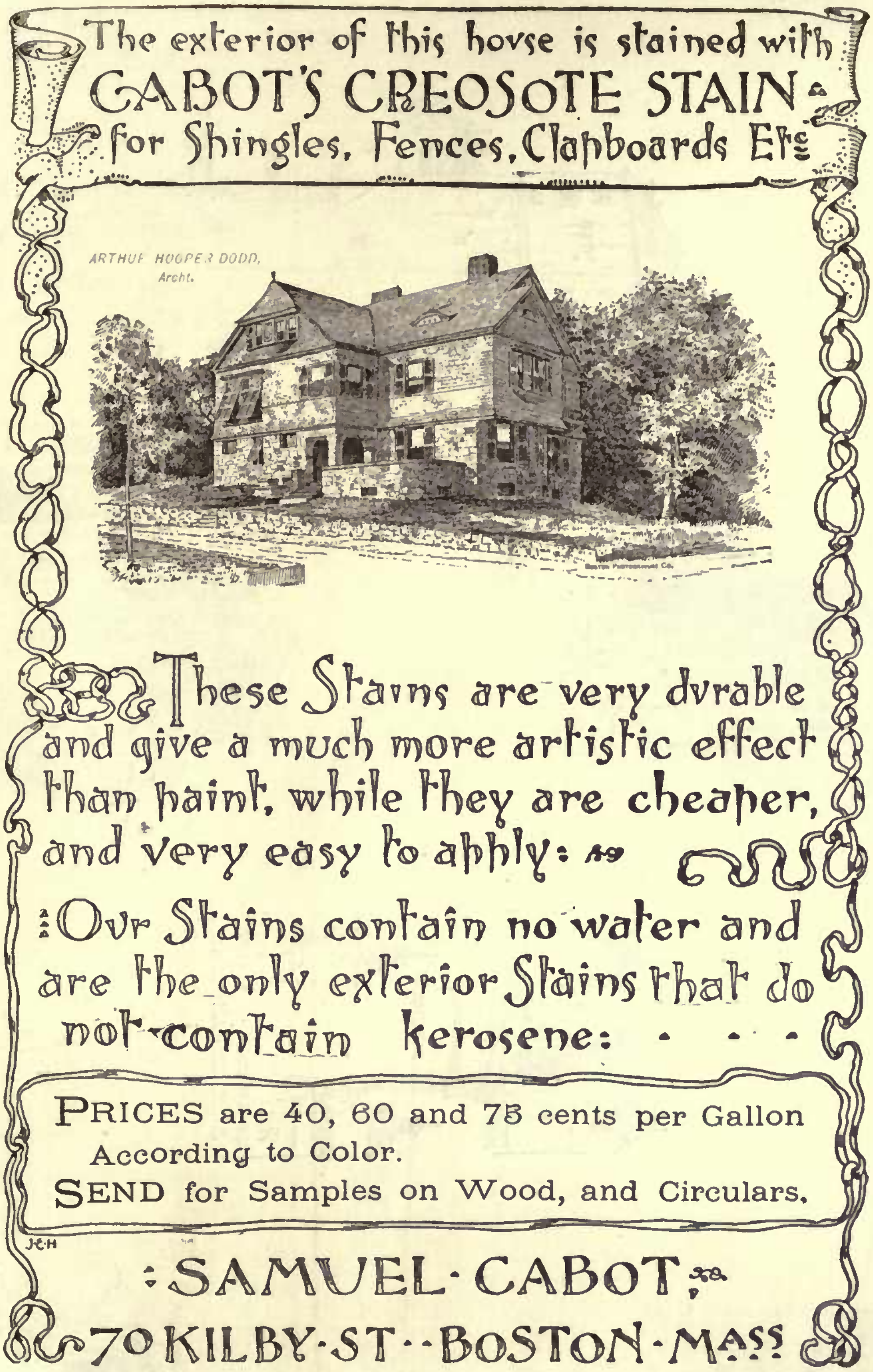
FIRST FLOOR PLAN

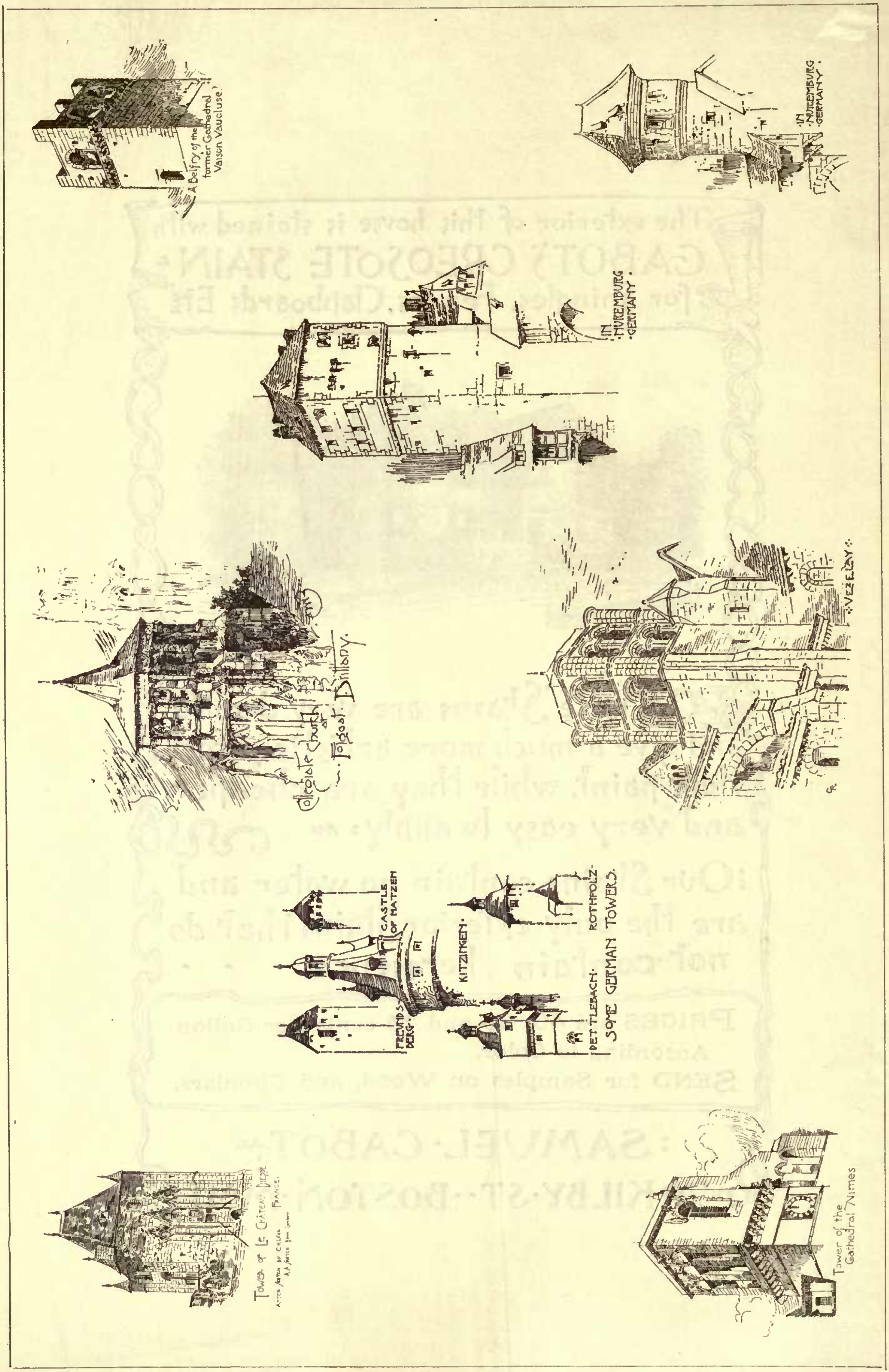


HELIOTYPE PRINTING CO., BOSTON.

HOUSE ON ——— STREET, WASHINGTON, D. C.

JAMES G. HILL, Architect.


The exterior of this house is stained with
CABOT'S CREOSOTE STAIN
for Shingles, Fences, Clapboards Etc.
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A Belfry of the former Cathedral Vaison Vaucluse
IN NUREMBURG GERMANY
IN NUREMBURG GERMANY
Collegiate Church at Folgoët Brittany
VEZELAY
CASTLE OF HATZEN
KITZINGEN
FREUNDSBERG
DETTLEBACH
ROTHFOLZ
SOME GERMAN TOWERS
Tower of Le Chateau Dieppe France
Tower of the Cathedral Nimes

TOWERS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE last chapter in the history of the competition for the Criminal Court Building in New York is the most interesting, if not the most edifying, of all. It will be remembered that three plans were selected by the "experts" called in to consider them, and that the Board of Commissioners, not satisfied with the award, appointed a committee out of its own number, which, strange to say, hit upon the same plans that had already been recommended by the experts. The question then came up on the final choice between the three selected ones, and, after some broad hints as to the "exorbitant" character of the ordinary architects' commission of five per cent, the authors of the three chosen plans were invited to appear before the Board. One of them, the signer of the plan marked "*Droit en avant*," was prudent enough, seeing the way that matters were going, to stay away, and is to be congratulated on his discretion; the other two, Mr. J. W. Wilson, of the firm of Thorn, Wilson & Scharschmidt, and Mr. Napoleon Le Brun, came in, and proceeded at once to the point by saying what they thought their services were worth. Mr. Le Brun said, it is alleged, that he thought the building could be erected for thirteen hundred thousand dollars, and that he would make the plans, including furnishing the paper and ink, and supervise the construction, for three per cent on the cost. Mr. Wilson said that he had somewhat hurriedly "estimated" the cost of executing his design at one million dollars, but now thought it would cost about forty per cent more than that. He would make all the plans, including furnishing the paper and ink, and supervise the building, for two per cent on the cost. This liberal offer appears to have pleased the Commissioners, and Mr. Wilson's plan was unanimously adopted.

THE movement now in progress for bringing about a closer relation between the republics of the Western hemisphere is an important and interesting one, whether it is successful or not. It does not seem very likely that sentimental considerations will induce the people of Chili and Venezuela to buy their dry-goods and groceries from New York, if they can get them cheaper from Liverpool or Bremen, so that the course of trade will probably remain without much change, notwithstanding the apprehensions of some of the English papers as to the result of the conference soon to be held in Washington, but, although the United States is, perhaps, hardly likely to be taken into the fold, a confederation between the Spanish-American States of South and Central America, which seems quite possible, would be one of the most serious events of the century. In our own self-satisfaction at our political importance, we hardly realize that the present population of South and Central America, including Mexico, is not very much less than that of the United States at the time of the Civil War, and that it is increasing with great rapidity, while in military and naval force the combined South American States far surpass us. Moreover, the common idea, that the Spanish-American States are too warlike, and too jealous of each other, to form a permanent union, needs now to be considerably modified. Not only are the South American States as closely allied in blood and feeling as our own colonies at the time of the Revolution, but a long step has already been taken toward confederation in the establishment of a judicial union, which has been for some time in force, and under which the decree of a court of record in one State is binding in the other States. In our own country, after a hundred years of existence as a nation, the States have hardly yet surrendered their judicial independence so far as this, and the fact that such a measure should have been adopted shows that the feeling in favor of a more complete political unity must be already tolerably strong in South America, and that a man of strong will, like many of the heroes of South American politics, might use it to bring about great changes in the condition of affairs. It might not be altogether pleasant for the United States to find suddenly, on the day after a South American election, that it thenceforth shared the Western continent with a nation equal in population to Great Britain, well equipped with soldiers and ships of war, and governed by an ambitious dictator, with a thirst for picking quarrels with his neighbors. Of course, in a contest with such a nation, it may be presumed that Anglo-Saxon persistence would win the day at last, but a fleet of ships like the Chilian "*Esmeralda*" would at the present time make short work of our great seaports, and, while we may feel a just confidence in our courage and resources, it would not be amiss to treat people who have been kind and modest friends, and who may become powerful enemies, with a little more courtesy and discretion than we have occasionally shown toward them.

THE *Commercial Advertiser* publishes some remarks, which it attributes to Mr. Park Benjamin, of New York, about Dr. de Bausset's proposed air-ship, in which Mr. Benjamin is represented as saying that the air-ship is "either a fraud or the result of an extraordinary scientific blunder," that it is "not practical," and that its inventor has probably "become misled on the subject of air pressure and the weight of air." As the article spells "subtract" with one more "s" than the dictionary allows, we are inclined to think that the whole story is the invention of some ignorant newspaper reporter, particularly as it represents Mr. Benjamin as saying that "The idea of a vacuum having a lifting-power, a force to buoy up, is simply ridiculous." It is hardly necessary to say that it would be a great deal more ridiculous for a man pretending to a knowledge of the elements of physics to deny that a vacuum has "a lifting-power, a force to buoy up," exactly equal to the weight of the air which it displaces, which is all that Dr. de Bausset claims, but even this forgetfulness of facts in science, which every school-boy knows, is less displeasing than the absurd and childish misrepresentation by which the remaining portion of the article seeks to discredit Dr. de Bausset's well-studied scheme. The imaginary Mr. Benjamin, whose arithmetic appears to have been as much neglected as his spelling, is reported to have said that Dr. de Bausset "bases his calculations apparently on the following statement: 'The weight of a cubic yard of air is 263 pounds, and thus the weight of air in this immense car will be 721,873 pounds.'" The supposed scientific expert is represented as going on to say that "This is unquestionably a wonderful discovery. I know of nothing more calculated to astonish the scientific world than the startling announcement — not of the invention of the air-ship — but of the remarkable change that must recently have taken place in the weight of air." "I have consulted various authorities on the subject, and I cannot find one that does not cling to the fallacy that a cubic foot of air weighs only about an ounce and a quarter, and that a cubic yard of air does not weigh 263 pounds, but only a very little more than two pounds. This condition of nature's affairs would necessitate a slight revision of Dr. de Bausset's calculations, resulting in the conclusion that the weight of air in the immense car would not be 721,873 pounds, but about 78,300; so that giving Dr. de Bausset the benefit of all this difference in weight, it would seem that the problem which he claims to have solved is that of lifting a weight of 415,696 pounds by means of only 78,300 pounds of power." "Any man who can do this," he goes on to say, "is a magician. I can sum up my opinion of this great discovery

in one word, — it must be a miracle," and "the effort to lift one's self over a fence by the boot-straps pales in comparison."

ALL these elegant sarcasms, although proceeding from one who is alleged to have "obtained a full description of the proposed air-ship," and to have "studied the plans thoroughly," have a certain weakness; they are based on what appears to be a wanton and designed misrepresentation of Dr. de Bausset's calculations, and are pursued, not only without any attention to the real point of the matter, but with a carelessness in regard to the simplest details which would be ludicrous, if it did not appear to be malicious. Referring to Dr. de Bausset's book, which we have at hand, we find that he gives, on page 19, the weight of air as 2.63 pounds to the cubic yard. The decimal point is perfectly distinct, and the weight thus given is that upon which all authorities are substantially agreed. Moreover, all Dr. de Bausset's calculations are based on this weight, and the result at which he arrives, that his car will have a displacement, that is, a gross buoyancy, of 720,000 pounds, agrees with that at which every one must arrive who applies the multiplication-table with ordinary skill to the dimensions of the car as given in his book, and correctly quoted by the *Commercial Advertiser's* ideal scientific man. Concerning the arithmetical process by which the latter comes to the conclusion that as Dr. de Bausset took the weight of the air one hundred times too great, therefore the displacement of the car would be 78,000 pounds, instead of 720,000, we need make no remarks. It is fortunate that Dr. de Bausset did not have to depend upon experts of that sort to make his computations for him. As we said at the beginning, it is incredible that a man of Park Benjamin's reputation should really have fallen into such a series of blunders, and the editor of the *Commercial Advertiser* may have his attention called in an unpleasant manner to the fact that he has discredited what he calls his "recognized authority on scientific matters" a good deal more than he has the project which he calls "a large and magnificent impossibility, and probably a fraud."

THE *Builder* gives an interesting description of the new Hôtel de Ville at Paris, with the works of art in the shape of pictures and statues which have actually been placed in it. As every one knows, the building is as far as possible a reproduction of that destroyed by the Commune, with some remodelling and enlargement of the plan. Although nominally a town-hall, the municipal offices occupy only a small part of the building, the rest being taken up by enormous reception-rooms and banqueting-halls, and on these the best sculpture and painting to be had in France has been lavished. The *Builder* describes more than two hundred statues in its account, all by the most distinguished sculptors in the country, without counting the bas-reliefs and bronze figures intended merely for ornament; and the walls and ceilings not decorated in some other way are now being painted by Benjamin Constant, Clairin, Bonnat, Puvis de Chavannes, Besnard, Jules Lefebre, Louis Loir, Lhermitte, and many other artists equally eminent. More astonishing, however, even than the wealth of artistic interest which is to be crowded into the building is the smallness of the price at which it is all to be obtained. The construction of the whole has cost about three million, six hundred thousand dollars, and three hundred and twenty-five thousand more has been spent on sculpture, while five hundred thousand has been appropriated for the painted decoration of the interior. The total of all these amounts to about four million, four hundred thousand dollars, for which Paris will acquire a structure covering three acres of land, with, perhaps, the most splendid expression in modern times of the three great arts. We are well aware how reprehensible it is to compare foreign buildings with our own, but we cannot help wondering if the time will never come when Americans, by spending four times as much as the Hôtel de Ville has cost, can get something better than a building in which the principal decoration is a monument to the meanest and most impudent piece of corruption that even American politics has to show, and where one thanks fortune, with reason, that the sculpture and painting usual to our public buildings has been dispensed with.

M. MARCEL DALY gives, in *La Semaine des Constructeurs*, a test for discovering whether a given brand of Portland cement is liable to swell after setting, which is new to us. Every one knows that much of the Portland cement shipped to the United States, together with a great deal of that used elsewhere, is apt to expand, perhaps some months or even years after setting, losing its hardness, and bursting or injuring the work on which it is used. The most noted case of the kind is that of a sea-wall in England, which, a long time after it was built, began to come to pieces, and at last had to be taken down and rebuilt. To avoid such catastrophes, it is common in England to expose the cement to be used in a building to the air for some weeks before making it into mortar, and some of our best engineers discourage the use of Portland cement altogether. With proper precautions, however, Portland cement is an excellent material, and M. Daly, who appears to have derived his information from the accounts of the experiments of Professor Tetmajer at Zurich, says that the propensity to swell in air may usually be detected by mixing some neat cement with water and pouring out the paste on two smooth plates of glass or metal, so as to form two cakes about four inches in diameter and three-eighths of an inch thick. The two plates are then to be placed in a damp box for twenty-four hours, or until they have set completely. After this they are to be taken up, without disturbing the position of the cakes, and put in an oven, which is to be gradually heated to about two hundred and fifty degrees Fahrenheit. In this temperature they are to remain for two or three hours, or at least half an hour after steam has ceased to rise from them. If, after this treatment, the cakes are twisted or warped, or show cracks radiating from the centre and larger toward the outside, the cement is to be rejected, at least for constructions in the air. An appearance of small cracks running concentrically around the cake need not condemn the cement, as such an effect may be caused by too rapid drying. Where the cement is to be used under water, or where adulteration with plaster-of-Paris is suspected, similar cakes should be made, using for mixing a trifle more water than in the first case, and thinning the cakes toward the edge. After subjecting them to the test already described for disposition to swell in air, they are to be placed in water and left there for at least four weeks. At the end of that time, if they show no sign of twisting or any radiating cracks, they may be considered free from liability to swell under water.

A LOTTERY, under the direction of Government officials, is to be held in connection with the Paris Exposition, with a semi-charitable purpose which takes away from it some of its objectionable character. Fifteen million tickets are to be issued, and placed on sale, at the uniform price of one franc each, at the tobacco stores and other places where postage stamps are sold, and are even to be sent into the remote rural districts, under the care of the tax-collector, who will fill orders for them. One-third of the proceeds of the sale of the tickets, which, if they are all sold, will be nearly three million dollars, is to be devoted to paying the railroad fares and entrance fees of certain classes of persons, to be designated by the Government, who would otherwise be unable to afford the expense of going to see the exhibition, and the remaining two-thirds is to be spent in the purchase of interesting objects from the exhibition, which are to be distributed by lot among the holders of the tickets. The French are fond of lotteries, and by this ingenious scheme the exhibition managers will please the exhibitors, who will be glad to sell their goods at the prices they ask, and will sell a considerable number of admission-tickets to persons who would otherwise be lost to them. There is, however, nothing unfair about the plan, and if every person who buys a ticket has the prospect of having two-thirds of its value returned to him in a prize, he is better off than in most lotteries.

MEYERLING Castle, where the Crown Prince Rudolph met his tragic death, is, according to the *Weiner Bauindustrie-zeitung*, to be turned into a convent for Carmelite nuns. The room in which the Crown Prince died is to be formed into a chapel by extending it so as to comprise the next chamber, and by the removal of the ceilings and the substitution of a domed vault, which is to include the rooms above. The apartments for the nuns will be fitted up, with such additions as may be necessary, in the simplest manner. The smaller buildings attached to the castle are to be converted into an asylum for ten invalid or superannuated foresters from the neighboring territory.

BUILDERS' HARDWARE.[1] — XXIX.

DUMB-WAITER FITTINGS.

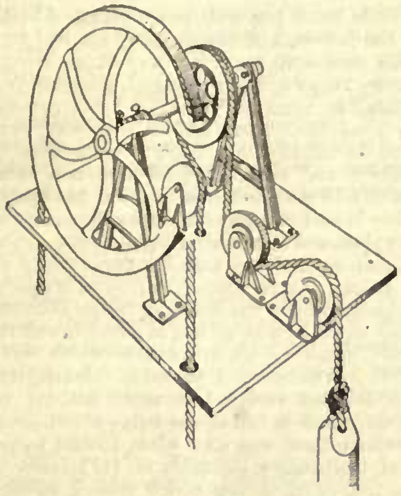


Fig. 451. The Cannon Dumb-waiter.

There are three styles of dumb-waiters in common use. For the cheapest sort of work, a rope is attached to the top of the car, carried up over a wheel, down one side to the bottom of the well, under a second wheel and up to the bottom of the car, to which the end of the rope is attached. A counterbalance weight is connected with the top of the car by a rope passing over a third wheel.

Another style is shown by Figure 451. A rope is fastened to the top of the car and passes about the four small wheels to the counterbalance weight on one side. One of these wheels is on the shaft of a large wheel over which a thick rope is carried and continued around a similar wheel at the bottom of the shaft. This holds on the large wheel simply by friction, and in moving, winds up or lowers the hanging-rope.

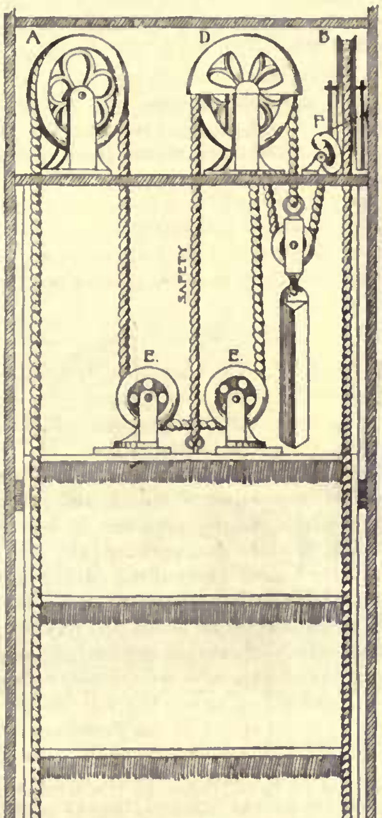


Fig. 452. New York Safety Dumb-waiter. Edw. Storm Spring Co.

The third style is illustrated by Figure 452, with a plan of the upper gearing, Figure 453, and a diagonal view of the upper works, Figure 454. A rope is attached to the bottom of the shelf on which the upper wheels rest, starting at *1*, Figure 453. Thence it is carried down to and under the wheels *E E* on the top of the car, up through 2, over wheel *A*, and down through 3 to the wheels at the bottom of the shaft. Then it is brought up through 4, over wheels *B* and *C*, and there connected with the counterbalance by a pulley, the end of the rope being fastened to the under-side of the top shelf, close by where it started. A safety-rope is attached to the top of the car, carried up through 5, over pulley *D*, and connected with the counterbalance. A cam-brake, Figure 455, on the shelf beside 4 prevents the car from descending when heavily loaded. It will be seen that all the working connections are made with a single rope, so arranged that no matter how much it may stretch, it will always be taut, the slack being taken up by the counterbalance, so that the slightest motion of the rope will start the car. This style is very generally used in good work.

The doors at the openings into the dumb-waiter shaft are

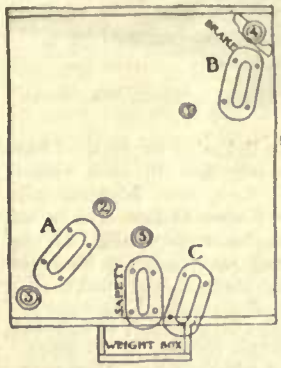


Fig. 453.

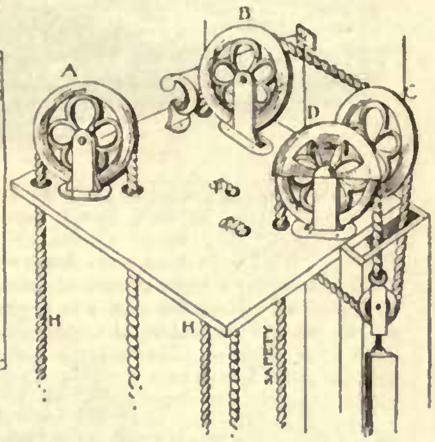


Fig. 454.

usually hung in the same manner as an ordinary window, and are provided with some form of spring-catch like Figure 456,



Fig. 455. Brake.

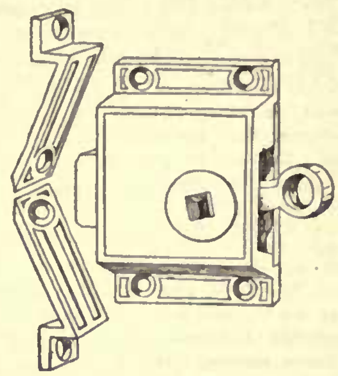


Fig. 456. Catch.

which will hold the door either up or down, the catch being released by depressing the arm at the side.

The following table gives the average retail prices of the miscellaneous articles described in this chapter.

TABLE OF MISCELLANEOUS HARDWARE.

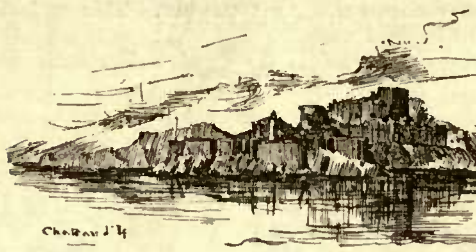
Fig.			
417	Brass Screw-hooks	per doz.	15 to 25 cents.
419	Picture-hooks	per doz.	35 to 42 cents.
420	Chandelier-hooks, 6-inch screw	each	58 cents.
422	Hammock-hooks	per doz.	$ 1.12
423	Clothes-line hooks, 4 screws	per doz.	.42
	Stair-rail brackets	per set	.10
429	Letters and numbers, 2-inch	each	.35
430	Letter-box plate, plain	each	.75
436	Bell-fixtures, complete without wire	per set	1.00
	Bell-gong, bronze handle	each	.75
	Gate-fixtures, hinges or latches	per set	25 to 50 cents.
452	N. Y. Safety Dumb-waiter fittings	per set	15.00

[To be continued.]

[1] Continued from No. 704, page 293.

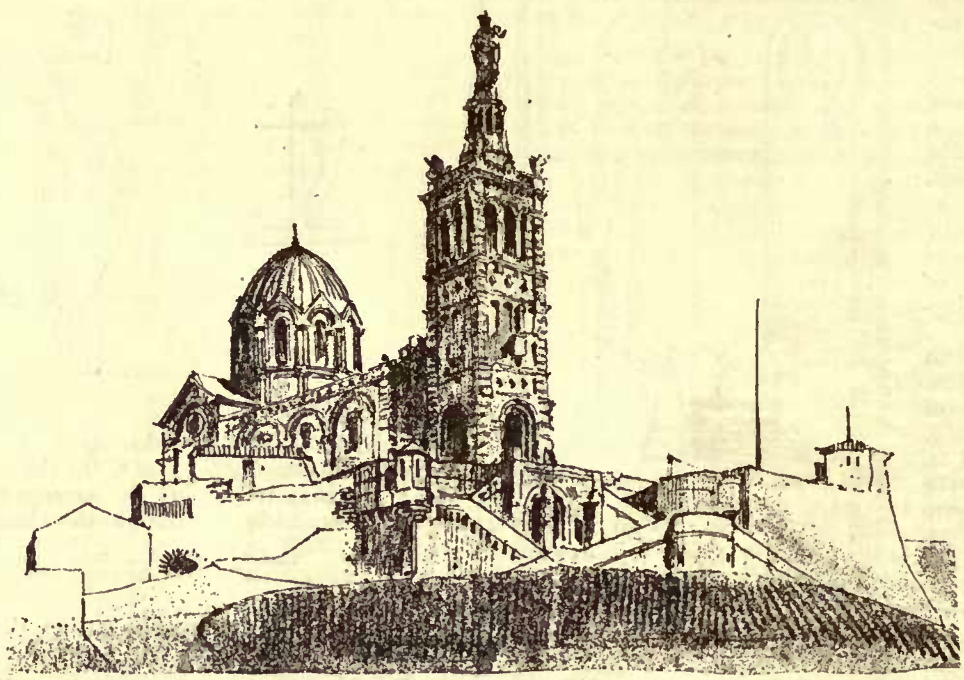
Model of the Centennial Buildings of 1876. — Mr. John Baird, of Philadelphia, has had a dozen men employed for more than a year, making an exact model of the Centennial buildings and grounds. The design is now completed, and, through Mayor Fitler, Mr. Baird has offered it to that city. The model is thirty feet in diameter, and cost between $12,000 and $15,000. Trees, buildings, people and a thousand peculiar features of various kinds are reproduced with wonderful skill. It is proposed to put the model under a plate-glass case in one of the Philadelphia parks. The case will cost about as much as the model. — *Exchange.*

AN ARCHITECTURAL KNOCKABOUT.[1]—III.



FROM Brussels I went to Paris by the lightning express. I have never ridden at such speed, certainly not in such rickety carriages: they would squirm and turn with frightful jolts. Leaving Paris I went down to the South of France by Lyons, Dijon and Toulon, stopping a night at each of these places, till finally I arrived at Marseilles. Here the cold was terribly severe, but its bitterness did not prevent my visiting the objects of interest here, and making a few little sketches. Marseilles is one of the most picturesque and peculiar cities I have ever been in. It lies in a valley, so to speak, with its railroad and depot far above the city proper.

By climbing the very steep hill on which is perched the splendid church-fortress, "Nôtre Dame de la Garde," with its great statue on the summit of the tower,—the figure, which is supposed to represent the Virgin holding her child, is terribly out of proportion with the structure below, it being far too massive—one can see the whole panorama of the city,—the beautiful harbor, which reminds one of Naples, with its royal park coming to the very edge of the sea, with well-made roads winding in and out along the shores, the water of that glorious Italian blue making the scene by far too lovely for me to describe. One can see the whole city in plan as it were, and can perceive the inhabitants moving like tiny ants far, far below.



Notre Dame da la Garde, Marseilles.

The greatest object of interest to me was, quite away out to sea, the Château d'If, made famous by Alexandre Dumas. There it was, black and sombre against the blue sky. I seemed to see it in its tyrannical glory of long ago, and the story of the incarcerated abbé and young Edmond Dantes came vividly before me.

Descending, I visited the Ecole des Beaux-Arts and the Arc de Triomphe, and finally looked over and sketched that wonderful toy, for such it almost is, Le Palais de Longchamps, nothing more nor less than an artificial waterfall, but so constructed and fashioned that it makes a tiny Niagara, through falling from architectural motives into innumerable individual falls: mammoth carved-stone bulls roar and plunge in the water, while an enormous buffalo splashes and snorts with an accompaniment of wild horses, all spouting and bathing in the roaring cataract around them. A great central building done in that very ornate French Renaissance surmounts the falls, while two columned galleries running on a curve start out from either side, and end in a structure similar to but smaller than the central motive. Great stairways ascend to the galleries on either side, with every conceivable form of balcony and place of observation at all the landings. It was very beautiful, without a doubt, but hardly practicable for Central Park, New York, for instance. I was very anxious to go over to Algiers and get warm as the trip was very inexpensive, but as I thought that Italy was just as heating and as I really was very anxious to get there, I left Marseilles at night, in a second-class compartment of a train which took twenty hours to get to Genoa, along the Riviera. I had suffered a great deal from the cold, but to arrive at Nice and find it in a condition of frigidity sufficient to suggest the building of snow-forts or the rigging up of a tobogan-slide somewhat dashed and broke up my roseate ideas of Italian sunshine. I made up my mind that this temperature was exceptional, as every one had told me I would suffer from the heat in Genoa and Middle Italy. Suffer from the heat! I can never do that again.

At Genoa I put up at a little hotel jammed into a chaos of buildings; it was situated near the bourse, and one on going out had very nearly to tie a string to his person to trace his way back through those miserable little Genoese alleyways. It rejoiced, with its proprietor, in the good old familiar name of "Smith," "Albergo del Smith." It was originally a monastery, and had in each story, one exactly over the other and identically the same, a bake-oven. I examined these with interest and made a rapid sketch of one. Those old monks! Mr. Smith told me (it did me good to pronounce a name that didn't end either in an i or an o) that he had found many rich carvings that had been plastered over when he came there. The clergy in Italy interested and amused me, and I made many a sly sketch of some old hooded father. Once I passed a funeral-march of the Brethren of the Misercordia, which was startling in the extreme. The greatest object of interest, or it was to me, in Genoa, was the Campo Santo with all those wonderful statues, one of which was a monk reading his prayer-book in a cloister. I passed it, thinking it to be a white-hooded father, but not seeing him move when I returned, I was startled and surprised to find it was only carved out of stone. I had a good American thrill one day when I stood before the statue and monument of Christofero Colombo, of 1492 fame. I remained in Genoa about ten days, during which time I devoted myself to the artistic most assiduously.

About this time I was seized with an uncontrollable desire to economize. Paris had reduced the "surplus" somewhat. I wanted to get to Rome. I was a little vague as to where Rome actually was and how one got there, but by plunging desperately into "Baedeker" I emerged therefrom with a perfect knowledge of its location, and with the great question as to my getting there decided, namely, to go by ship to Leghorn, from thence to Naples and then on to the Eternal City. The main reason for this scheme of mine was, that while I was sitting at home one night by a crackling wood-fire, I was told by an experienced traveller that the only true way for a man to travel on the Mediterranean, either winter or summer, was to take a deck-passage, thus, lying on the deck with cigar and Bologna sausage in hand, listen to the strains of the immortal "Funiculi," rendered by the soothing guitar and mandolin, and arrive—anywhere. This all sounded simply beautiful, the fact of finally arriving somewhere was something, so acting upon the impulse of the moment I started for the office of the Mediterranean Steamship Company. After having wandered in every conceivable circle through those bare Geonese alleyways, I arrived at last at my destination. Then by dint of perseverance, bad French and worse Italian, the latter of my own construction, I managed to address the official in something like the following: "*Arrete un batello a vapore che faccia il tragitto a Napoli,*" and "*Si ferma esse ad Livorno,*" or in better English, "Is there a boat going from here to Naples, and does it stop at Leghorn." To my delight I found that there was, and that the steamer would sail on the next night. The ticket-agent inquired what class I preferred, I replied that I wished the deck-passage. He seemed to misunderstand me and repeated his question, my answer being the same, he smiled and handed me a fourth-class ticket. I learned from the perusal of this document that deck-passengers were provided with no bed nor food—this dreadful fact took away the poetry of the thing decidedly I thought, but I resolved to see it through. Going back to my room I found that in "cashing up" I had made about $52.64 by choosing this cheap mode of travel in preference to that by the railway—the trip by boat costing about $6.75. Having made all this money I felt that I had a right to dissipate slightly before starting on my journey, so I indulged in a fine dinner and went to the opera. The next day I purchased a bologna sausage, huge in dimensions, a stick of bread

[1] Continued from No. 707, page 16.

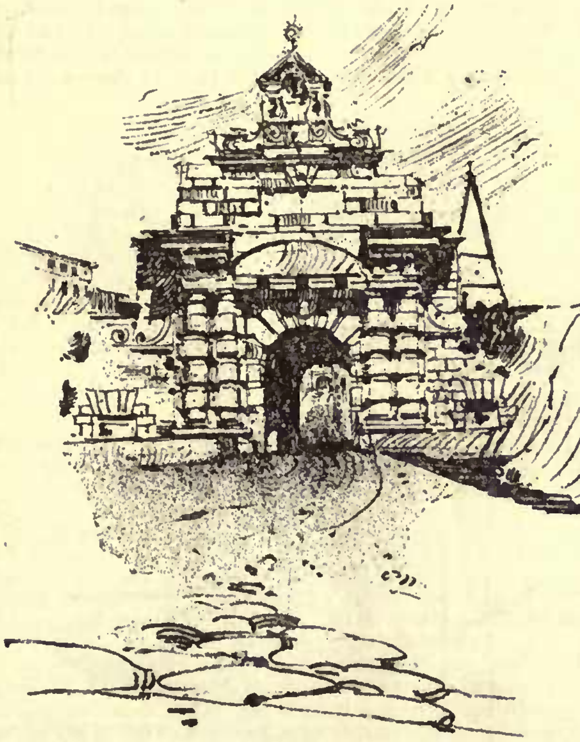
and a piece of Italian cheese for my sustenance on the trip. Provided with these articles I knew I could sustain life or meet death, for I really began to have doubts which of the two would be the most formidable to combat. As to baggage I had none to speak of, merely my knapsack, in which I kept my sketch and guide books and a few necessary articles. I had not even brought my blanket with me, only taking my rubber mackintosh, for people told me I would suffer so from the heat: I was then so cold I could hardly speak! Imagine any one ever suffering from the heat in Italy or anywhere else. The official at the steamship office told me that my noble ship, the "*Magesta*," had anchored over the bar, and was to sail at nine o'clock. I was to go to a certain dock and get myself rowed out to the ship. So on the night of my departure I went to the appointed wharf and waited for some sort of conveyance to take me out. The night was cold and misty, and sitting there for three-quarters of an hour alone was not cheering to my frame of mind.



Misericordia.

At last I heard the splash of oars as a small dory came out of the gloom propelled by a jagged old boatman. I said the one word "*Magesta*" in answer to his rapid remarks which I interpreted to be an offer to take me out to any ship. This was all that was necessary for him to comprehend the situation.

He silently took my knapsack and placed it in the bow. I as silently squatted down in the boat, and was soon being rowed away from the shadow of the shore. We passed great steamers; each one I thought was my own, till finally my boatman pointed to a dark object resting on the water, and exclaimed: "*Il 'Magesta,' ecco!*" Looking up, I saw a small steamer with sailing lights displayed, and everything in evident preparation for immediate departure.



Porta Pila, Genoa.

I was hailed in Italian and French. I answered that I was a passenger, and wanted something "let down." In a second after paying my boatman I was on the deck. I was then addressed by an officer whom I supposed to be the purser (if they ever have pursers on board these vessels). He asked me for my ticket, and, at the same time, taking me in from head to foot by the light of his lantern.

On looking at my fourth-class ticket he smiled grimly, and ventured the remark that I had made a mistake. What could he mean? I was then told to go aft; so aft I went, stumbling over boxes and barrels as I groped along in the direction he indicated. I soon sat down on a coil of rope, and thought the situation over. Things did not look bright at all. It was cold and damp, and the idea of sleeping on the deck, wet and hard, with no other covering than the mackintosh I had on, and with no other sustenance than the bologna and bread I had brought, became disheartening in the extreme. I then said to myself: "I'll see exactly what I'm in for." So still groping in the semi-darkness, I went to the extreme end of the ship, where I discerned a mass of moving figures. "Oh," said I, "these are probably the steerage passengers." Still continuing further to take a look at these people, I missed that continual jabbering which one always hears among that class of Italians. This seemed peculiar, when, to my utter amazement and disgust, I found that I was standing amidst about four hundred head of Italian cattle.

Retracing my steps, I made my way to the extreme opposite end, the bow, only to find it crowded with about two hundred cavalry horses and their riders, who were on their way to Naples. This was too much; so, finding an officer, I went up to him and asked in as polite French as I was master of "if there was any deck space for a man of my inches to lie down upon; if so, for Heaven's sake, let's see it." He smiled and told me, pointing to the boiler of the ship, which was raised on the deck, now covered black with men, women and children, that that was all the accommodation a deck passage afforded. Imagine my feelings as I surveyed this living mass before me to see if it was possible (if I could bring myself to it) to find space enough to lie down among them, but there was not even space enough to lay my bologna down. Thoroughly disheartened by this sad reality, I went to the same officer and said that as I had found no place to sleep I had decided to raise a class. This would only cost me two or three dollars extra, so I felt as bravely economical as before. This was third class, and I "bunked" with the soldiers *en masse*. This was, it is needless to say, luxury compared with my former condition. The vessel finally got underway, and the mob turned in at nine o'clock, Italian time.

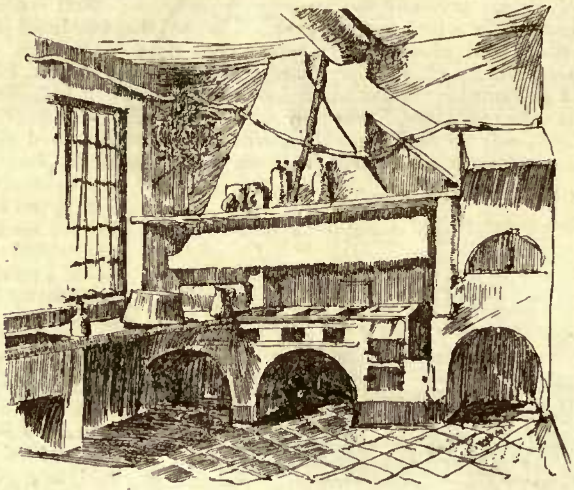


S. Ambrogio, Genoa.

I was still rather anxious to find out what I had in the way of a berth, so I followed the crowd of cavalrymen below. The third-class saloon was located under the main deck — a dark hold with one lantern in it. The beds were mere planks sliding up and down on two iron rods. In the daytime, these planks were pushed up and caught to the ceiling. They used the place in the day for peeling the potatoes and mixing the food for the horses and cattle. At night these beds above described were let down, and served as our soft couches. Selecting the widest-looking plank I could find in the very dim light, I hoisted myself up onto the board, using my knapsack as a pillow and my mackintosh as a blanket. I spent a night of the most acute agony, only to be realized by those trying it or placed in the same predicament — a night of one continued attempt at elaborate balancing on a board.

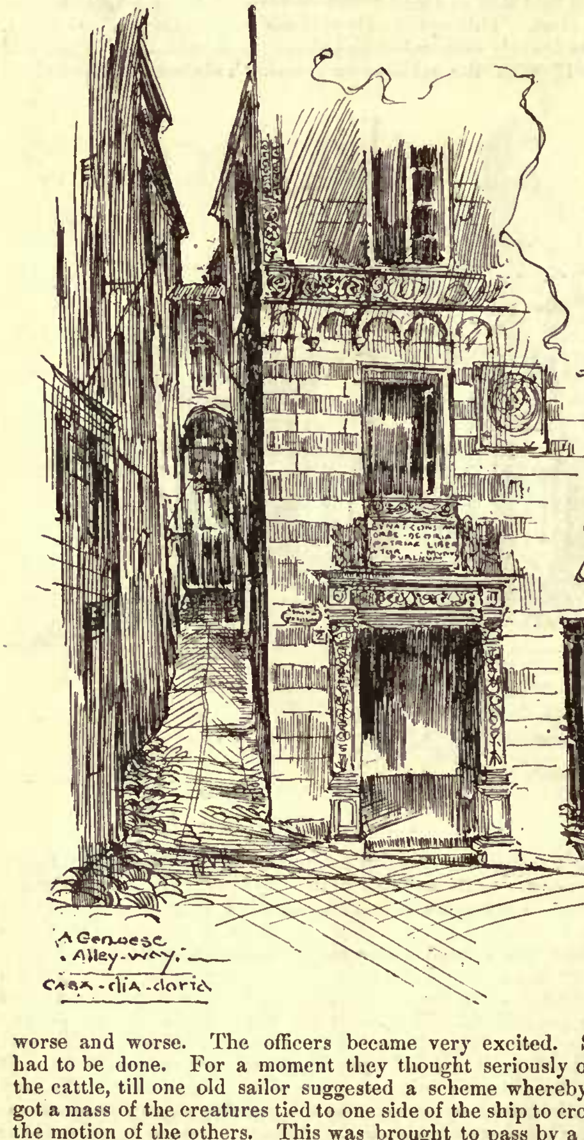
The cold was intense, and I began seriously to give up all hope of ever getting warm again. I hadn't seen any oranges yet, or hot sun either, both being my idea of Italy.

About two o'clock in the morning, I was rudely thrown to the floor by a violent rocking of the ship. A thought flashed through



Genoese Kitchen.

me that we were either sinking or out in a terrible storm. The engine stopped, and I ran on deck, to find that the cattle, tired of standing still so long and in such close quarters, had moved forward and back as cattle will when tired or impatient, until the motion became steady and of sufficient force to influence the ship itself, so that she rocked violently from side to side, and at every lurch became



worse and worse. The officers became very excited. Something had to be done. For a moment they thought seriously of shooting the cattle, till one old sailor suggested a scheme whereby the crew got a mass of the creatures tied to one side of the ship to cross-counter the motion of the others. This was brought to pass by a great deal of necessary clubbing with marlin-spikes and cord-wood, and the ship was brought gradually to an even keel. The engines started, and I went back to my bed once more. Hardly had I gone into a doze when I was again disturbed, this time by the ship's gong ringing at five o'clock for breakfast. Breakfast! This repast consisted merely of one little cup of black coffee without sugar or milk, and not a blessed morsel until ten o'clock. I kept body and soul together by nibbling my bologna.

At last, at ten o'clock, according to orders, I filed up with the soldiers to the kitchen or galley, where I was presented with a tin



Waiting for a Boat.

plate, spoon, tin bowl and cup. With these I was complete in dishes. I had to return these utensils at the end of the voyage. When my turn came I had my cup filled with Chianti wine, and my tin bowl with a compound mixture of macaroni, beef, greens, crackers and hot water (the last-named very prominent). Then, with a ship's biscuit and a morsel of cheese on top, I made my way, balancing my supplies on my arm, to my favorite coil of rope. There I ate the mixture with that gusto known only to the Italian — and myself.

At six o'clock I had a dose of nearly the same *menu*. Bed at nine again. I was informed at the office in Genoa that the trip to Naples was two days and a night. In reality, it took us three days and



I and my bologna.

three nights with perfectly calm sea and favoring breezes. At Leghorn, where we stopped, I got permission, at my own risk, to get off and try to see Pisa. The captain informed me that the vessel only stayed at Leghorn four hours, and that I must be back promptly, as he could not wait a second for any third-class passenger. Anything was better than remaining aboard, so, getting myself dropped over the ship's side into a dug-out, I pointed to Leghorn, or Livorno, as they call it, and told my boatman to row me "subito." The distance was a long one, and took up fully half-an-hour. About a stone's throw from the landing, the boatman stopped rowing and demanded "due lire." Now, as I had made an elaborate bargain with him to row me for one, I was not going to be "bamboozled" so easily. I got properly enraged at his outrageous imposition, and

ordered him to land me immediately. He refused, and, resting on his oars, quietly awaited developments. I saw that nothing could be done, as the wretched scamp had me at a big disadvantage, so ordered him to row me back to the ship. This he started to do. Then, as the "bluff" didn't seem to work, and my time was getting greatly limited, I gave in on a compromise of one and a half lires. I had also great difficulty in finding the railroad station from whence the trains departed for Pisa, so that all this lost time had practically spoiled my little excursion.

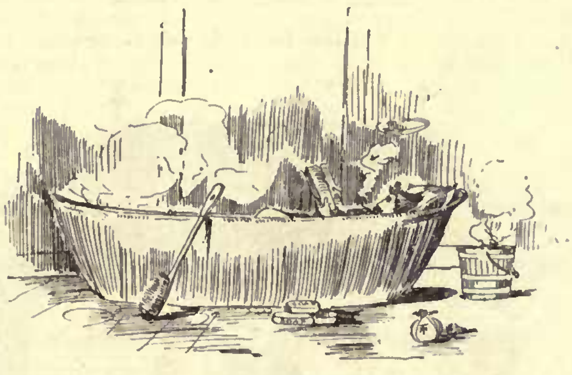
Much disappointed, I looked over the town with its coral and straw hats. I called upon the consul, who was very polite and charming, and who gave me a very long and very strong cheroot to smoke. Then, allowing myself a quarter of an hour, with the risk of having the price of being taken back to my ship raised to three or five lires, I walked to the landing to find my grinning oarsman ready to take me back without further extortion. He asked me how I had enjoyed Pisa. I didn't deign to reply.

There was the "*Magesta*" lying quietly at anchor, with swarms of little dug-outs crowding around, all trying to sell herrings and wine to the hungry passengers looking over her sides. I was finally put aboard, and only to find that the wretched vessel did not sail for four mortal hours after the time the captain said she would.

Burning rage o'ercame me, and, as the winds blew cold and chilly over the Livornian hills, I felt as if it were indeed a cold day for me. At last we were off again. I went through the same routine for the rest of the trip. Why I didn't die of cold, hunger, dirt and privation is a thing I can't explain. Perhaps it was the novelty of the situation that kept me up, or that in it all there was something so droll and curious. Often, in the middle of the night, I would burst out into a hearty laugh, while the snoring *gens d'armes*, the lowing cattle, and the neighing horses, mixed up with a faint odor of macaroni, gave a sort of grim humor to it all.

What made it to me a pleasant memory was that when we finally arrived in the Bay of Naples by the light of the cold moon, there was the beautiful city, with its rows above rows of brilliant lights, while high in the clouds sat that grand old furnace, "Vesuve," smoking and flashing away.

The sailors and passengers then, and then only, produced their guitars and mandolins, and with the "Funiculi" and "Addi Napoli" (which seemed a trifle inconsistent to me) played and sang in that



An Italian "Saturday Night."

glorious night with a sort of inborn genius which the Italian peasant, untutored and uncultivated, alone can call forth with such soothing effects. It made up to me for a great deal that I had undergone. I then, on the next morning (as no one was allowed to leave the ship that night), bade good-by to some officers who had been kind to me, and passed the custom-house; then, throwing myself into a carriage, was driven to the Hotel Riviera, where for the next thirty-six hours I gave myself up to the joys of well-earned sleep, Pear's soap and the Italian bath-tub. F. L. V. Hoppin.

[To be continued.]

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

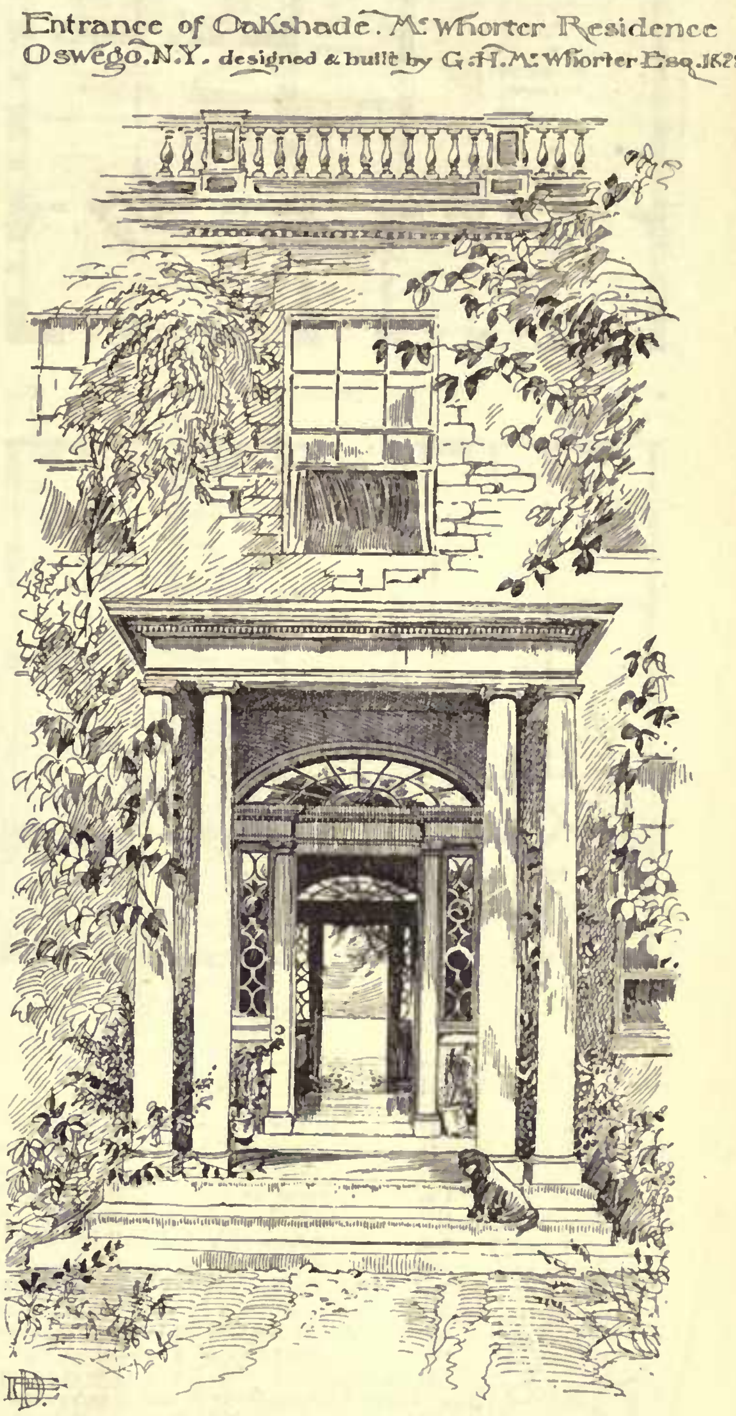
CLOISTER IN THE CAMPO SANTO, GENOA, ITALY.

[Gelatine Print, issued only with the Imperial Edition.]

See "An Architectural Knockabout," elsewhere in this issue.

CHURCH OF OUR SAVIOUR, ROSLINDALE, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

The church is being built entirely of wood, the wall being covered with shingles carried down below the sill, outside the stone-work, to the grade, so that very little underpinning will be visible. The main room is to seat about 230, and the Sunday School room 150. The main trusses of the church are to be a combination of the hammer-beam and the scissors forms, the timbers being quite heavy and roughly hewn. There will be no rafters, heavy purlins six feet apart, supporting the roofing-boards of 1½ inch spruce plank, which will be left rough, with a sawn surface showing inside of the church. The walls will be sheathed to a height of six feet, and rough-plastered above. The windows are to be filled with cathedral glass in plain graded yellow tones. It is proposed to stain all the interior woodwork quite dark and bronze the entire walls and ceiling of the chancel. The total cost will be in the neighborhood of $7,000.



A MODERN PALACE, GENOA, ITALY.

See "An Architectural Knockabout," elsewhere in this issue.

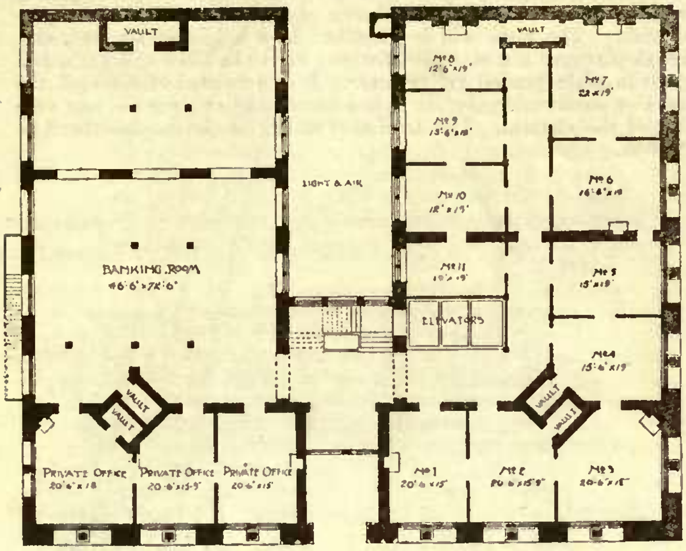
THE CAMPO SANTO, GENOA, ITALY.

See "An Architectural Knockabout," elsewhere in this issue.

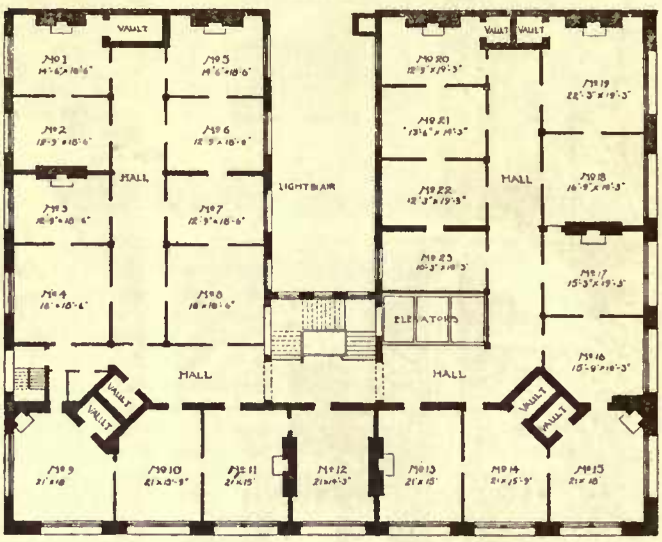
THE BOSTON BUILDING, DENVER, COLO. MESSRS. ANDREWS & JAQUES, ARCHITECTS, BOSTON, MASS.

The building is to be built entirely of red Colorado sandstone, the lower three stories to be rock face and crandled above that.

Finished in oak all through the interior; marble floor and wainscoting in the lower story. To be occupied entirely as an office building and to be of "mill construction" throughout, wire-lathed and plastered.

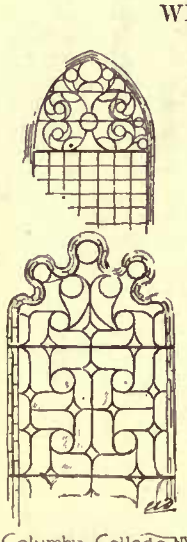


·1st Floor Plan·



·2nd 3rd 4th 5th & 6th Floor Plans·

WROUGHT-IRON GRILLES.



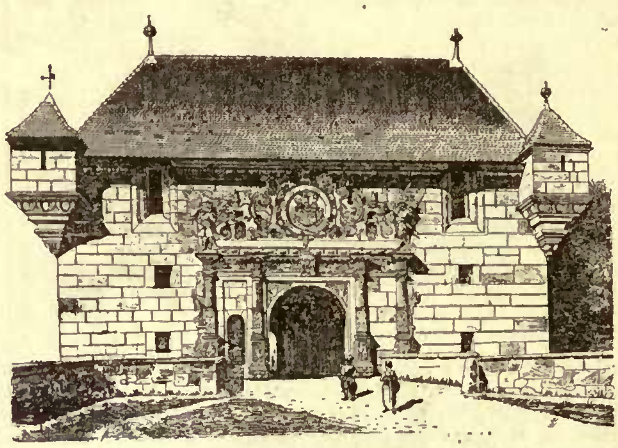
Columbia College, NY
Windows in Library

TWICE in our history blacksmithing, as a fine art, has flourished for a time, and then for long periods has lain dormant. At no time did it appear so moribund, however, as in the first decades of the nineteenth century. Its revival commenced with that of Pointed architure under Pugin and Scott, and was stimulated by Ruskin; but in a general way, it has lagged behind its fellow-crafts. But the situation has changed within the last half-dozen years, and we now run more risk of a redundant than of too stinted a production, for there is at present a fashion for wrought-iron, and it is applied to all kinds of objects hitherto made of brass or bronze. If this fashion is to be more than a passing wave, the smith and his designer must learn to distinguish what is original and good from what is mere vagary. Above all, with such a facile and easily abused material, he should learn to exercise restraint. The movement has been too rapid for thoughtful men or schools to develop, and no educated class of smiths as yet exist, and thus no craft is more in need of help and precept.

Of all objects in use, none rivals in utility the iron grille, whether used for protection or only for decorative effect. Nothing is less likely to be displaced by change of fashion, for iron affords in proportion to its bulk greater resisting power, and, therefore, more complete protection, than any other substance. Properly fixed window-guards give more security than shutters, and we are no longer confined, as we have been for almost half a century, to mere bars. Elegant forms can be produced within the reach of every one, and we can interpose between the window and the street beautiful objects which serve to screen our interiors from observation by day and to protect them by night.

The use of window-guards seem to have been known from the time of Solomon. The oldest actual specimens extant are those recovered in Pompeii, consisting of plain bars exactly like those still used in London areas, though we know that in Rome they were also of scale and lattice designs. Varied designs were used in Byzantine architecture, particularly by the Roman Gauls. The English were unsurpassed as smiths, and some beautiful specimens of grille-work tongs from the anvil while the iron was hot; while the mediæval Flemish work which superseded them was more the production of the file, saw and drill acting on iron cold. We have few specimens of window-grilles in this country, though as early as Henry III all the windows of tho numerous palaces were thus protected, but in France a good many are yet extant. Great use was made of them in Italy and Germany, and exquisite specimens, both of Mediæval and Renaissance periods, are preserved in our National Museum at South Kensington. But in these, as in all other specimens of iron-work, Spain of the sixteenth century far excelled every nation. Spanish window-guards are *chefs-d'œuvre*, simple and dignified in design, yet with refined and elaborate detail, light of aspect, yet of massive strength, furnishing endless designs which deserve our most careful study, though to reproduce them with the same chiselled and embossed delicacy of detail would cost more time than any smith would prudently spend. The distinguishing character of Spanish grille-work is that the body of the design is full of repose, while the scrolly ornament is concentrated where it least impedes the vision. In the revival of blacksmith's work that followed the Restoration of Charles II — in consequence, it must be owned, of his partiality for the French fashions of Louis XIV, who encouraged blacksmithing in France with his wonted magnificence — window-grilles were only occasionally used, but some most exquisite specimens by a French smith can be seen in St. Paul's Cathedral. Examples are met with here and there as late as the time of the brothers Adam, when they were commonly inserted in the fan-lights of street-doors and on staircase-windows. — *Journal of the Society of Arts.*

VITTORIA COLONNA.



Chateau de Tubingen, Germany.

MODERN criticism has adopted strange processes of study. In place of fathoming the work of a great man, researches are made into the record of his life. His clothes are stripped from him; he is analyzed on all sides; he is surprised as he steps out of bed; he is spied on in moments of the utmost privacy, and all this is called psychological study. Formerly it was enough to know that Michael Angelo had painted the Sistine Chapel, and that Lord Byron was the author of "*Childe Harold.*" Now it appears that in order to seize upon the marrow of the poetry of Byron, and to comprehend pictorially the drama of the "Last Judgment," it is absolutely necessary to know whether Lord Byron preferred port or Bordeaux, and whether Michael Angelo slept on his right or upon his left side. Italy has not escaped this rage for retrospective investigation, which, in place of bearing upon the creations of the masters, points only at their private life. The grand Italian poets of the last period, Foscolo, Monti, Leopardi, Manzoni have inspired during the last ten years a number of volumes large enough to fill several libraries. This has not augmented by a single line the poems left by these distinguished writers, and has added no beauty to their poems. In revenge the reputations of some of them have suffered to a considerable extent. Foscolo, for instance, who was considered the Tyrtæus of Italian independence, issues from this posthumous examination in a much diminished form, and has the air of a sufficiently villianous fellow who, not content with courting several women at the same time and cruelly betraying them, frequently borrowed from them, and was never disturbed at living at

their expense. Vittoria Colonna, the faithful and tender friend of Michael Angelo Buonarotti, has also drawn upon herself the converging magnifying-glasses of the analyists, who, within a short time, have written several books about her. Here researches were not wholly superfluous, for the physionomy of this patrician beloved by the muses, who had had the rare fortune to unite her name by a bond of affection to that of the greatest artist of the Renaissance, stood out with scant distinctness in the commonly-known chronicles, and only presented vague and ill-distinguished contours. To-day the outlines of this figure are better determined, and we can measure with more certainty the amplitude of her talent and the part which she played in the last years of the life of Michael Angelo.

Vittoria Colonna belonged to that patrician family whose fierce pride held in check at Rome the whole power of the popes — a family whose rivalry with the Orsini provoked in the States of the Church long civil wars. She was born in 1490, and had received a very thorough education, for, strange to say, in that time of relative barbarism, the learned did not hold that woman should be kept in a state of servile ignorance, and Julian de' Medici, apropos of the education of woman, said that she ought to be versed in literature, science and the arts, so as to be able to talk fluently on these subjects. The Italian woman of the fifteenth century (we here speak, of course, of women belonging to the upper classes) was, therefore, of a rare type of delicacy and learning; and Vittoria Colonna was above all the glory of that century, which so many other illustrious females also honored. At nineteen years of age she was married to the Marquis of Pescara, a descendant from a Spanish family who settled in Italy in the reign of Alfonzo the Magnificent. It was a *mariage de convenance*, arranged long before by King Ferrand II, who desired to effect by this alliance the definite attaching to himself of Fabricio Colonna, father of the *fiancée*, who, having been for some time a partisan of the French, had at length embraced the Spanish cause. But Vittoria possessed a mind so copiously nourished by the sentimentality of Petrarch and the poems of chivalry that she loved her husband as if he were a hero of romance, though, in truth, he hardly deserved it. He was a good soldier, courageous and valiant, but as a man he was absolutely despicable. He was wounded at the battle of Ravenna in 1512, where his conduct was admirable. Later he took Genoa by assault, and at Vico vanquished the Venetians, the allies of France. When the war broke out in 1521, between Francis I and Charles V, the Marquis of Pescara was invested with the command of the Imperial infantry, and in this capacity took possession of Milan and Pavia. The following year he vanquished the French at Bicocca, and by the capture of Pavia forced them to abandon Lombardy. At the battle of Pavia he gave proof of rare bravery, and in a letter to the Marquise, the Emperor Charles V acknowledged that he owed this brilliant victory to the zeal and talent of Pescara. It is at this time that took place the act which forever dishonored the life of this soldier. In spite of his promises, the Emperor was in no haste to reward his ally, as he had given him cause to expect, and the Duke of Milan, Ludovico Sforza, felt that the moment was propitious to beguile him into treachery. Morone, the Duke's chancellor, began secret negotiations with the Marquis of Pescara, with the object of making him discontented, and he, instead of rejecting these advances in disdain, entered into a conspiracy and made a pretence of being ready to commit the treason which was suggested to him. Then he denounced Morone to the Emperor. This denunciation brought about the imprisonment of the Duke's chancellor. Pescara, however, reaped no profit from his duplicity, for a short while after he died at the age of about thirty-six. Guicciardini, the great Italian historian, passes severe judgment on the Marquis, and rightly considers such a man unworthy of esteem.

Left a widow at the age of thirty-five, Vittoria Colonna abandoned herself to profound despair, although she did not approve the conduct of her husband towards Morone. Her sense of right was revolted at the idea of this piece of treachery, so little conformable to the chivalrous idea held in great honor in the world where she had grown up. Her chagrin is the more incomprehensible that even in the matter of conjugal affection the Marquis had behaved very badly, and had loved madly, amongst others, a maid of honor of the family of Gonzagues, at Mantua; but it appears that Vittoria was ignorant of this culpable *liaison*, and that she could not believe that the man she mourned had done her any injury. To console her grief, she first withdrew to a convent at Viterbo, and afterwards to the Convent of San Silvestro, at Rome. It appears that she had at one moment the intention of devoting herself to the life of the convent, but the Pope opposed this idea with much energy, and forbade the nuns to offer her hospitality or to favor these wishes. It is at this time that she abandoned herself with energy to the mania of making verses. I do not share the enthusiasm of some of her admirers, who would rank her poetry amongst the *chefs-d'œuvre* of the Italian language. These poems lack both sincerity and inspiration. They very visibly bear the imprint of Petrarchian mould in which they have been cast. Vittoria's imagination was, moreover, very poor, and her inspirations always roll with a monotonous uniformity about a conventional similitude, as that of Petrarch remained circumscribed within the calembourg furnished by the name of Laura, his beloved, and the tree which symbolizes Glory. In Vittoria's sonnets there is always introduced a ship beaten by a storm which struggles furiously against the waves and sea. Nevertheless, this obstinate inclination toward literature had rendered the widow of Pescara very celebrated, and, when in 1535 Charles V passed through Rome, after the campaign in Tunis, the only two patricians he deigned to pay his homage to were Jeanne of Aragon and Vittoria Colonna.



Rear View of the Cathedral at Padua.

The Marquise was always careful to surround herself with men of the highest education of the time, and formed about herself a *salon* of literary and artistic celebrities, in the midst of which she sparkled by her beauty as much as by her wit. Directly after her marriage, when she used to pass a great portion of the year at the Villa Piètralba at Naples, or in her château at Ischia, she brought into close intimacy with herself the fine flower of literary and political society, of which, amongst others, Zanazzovo, the Italian Moliere, Monseigneur Giovio, the historian, and Galeazzo di Tarsia, the poet, formed a part. The latter conceived a lively passion for her, which exhaled in his flowing sonnets, but she avoided his compromising attentions, and Tarsia, reduced to despair, exiled himself to France, whence he returned eleven years afterwards without having yet extinguished his flame. Later, Vittoria passed in this way some months at the Palazzo Marino, and there she counted amongst her satellites the Cardinal Piètro Bembo, the literary epicurean, and Ludivico Ariosto, author of the greatest poem of chivalry which figures in the Italian repertory. Little by little her fame spread through all Italy, and there was no well-read man who did not attempt to celebrate her praises. There is mentioned amongst these panegyrists, besides those already named, the poet Berni, Annibal Caro, translator of the Æneid, Tressin and Monseigneur della Casa. Aretino also held correspondence with her, and, faithful to his habit, which was to speculate upon everything and everybody, did not fail to take advantage of this friendship to obtain from the Marquise an enormous sum of silver, which, however, did not prevent him from covering her with epigrammatic vituperation later.

In 1537, Vittoria Colonna was at the Court of Ferrara. It appears that her relations with the Duchess Isabella of Este were tinged with a certain coldness, but in general she was much flattered and loved at this court, and, when Monseigneur Giberti was charged by the Gonzagues to influence her to go to Mantua, he himself writes that he hardly escaped being stoned for accepting the mission of removing from Ferrara so distinguished a woman; but the climate of the country was not agreeable to her, and, in spite of the cajoleries which they lavished on her, she was forced to abandon it. Three years afterwards she was again at Rome, where she made a friend of Juliet Gonzague, who had the reputation of being the most beautiful woman of her time, and whose reputation reached as far as the

Emperor Solomon II, who ordered Adrien Barbarossa to carry her away from Fondi, where she was dwelling at the time. She was saved almost miraculously by one of her servants, who took her in his arms and, almost naked as she was, escaped through a window with her. The chronicler adds that Juliet put this servant to death afterwards in order that he might not boast that he had touched her flesh. This same Juliet died in a convent at Naples in the odor of heresy [*sic*]. It was about this time that Vittoria, who had fallen, since the death of her husband, into an almost superstitious pietism, formed relations with some ecclesiastics accused of inclining toward the Reformation, and amongst others, with the famous Ochino, who, persecuted by the tribunal of the Holy Inquisition, went to die to Geneva, and with Contarini, a delegate to the Diet of Ratisbon, and the Cardinal Reginaldo Polo, who had a finger in all attempts which had for end and aim to arrange a concordat between the Church of Rome and the new German ideas, an arrangement which would have avoided, perhaps, the foundation of a Protestant communion. The Marquise interested herself in these religious agitations, and brought to it the ardent devotion of her feminine character and her Christian spirit; but when the rupture was declared between Rome and Germany the Inquisition opened proceedings against her, accusing her of having had relations with heretics, and she narrowly escaped being persecuted.

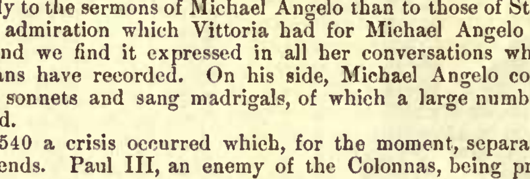
It was on the morrow of this catastrophe that she met for the first time Michael Angelo, who was to be the last and, perhaps, the most vivid love of her life. She had already reached a ripe age, while Buonarotti was on the threshold of old age. This is enough to give the lie to the unpleasant and ridiculous tales that certain historians have embroidered about this *liaison.* Nevertheless, although purely intellectual, this commerce between the poet and the artist was none the less very intimate, and closely followed up to such a point that Michael Angelo, having paid a visit to his friend on a certain day, when she was listening at the Church of San Silvestro to the reading of the epistle of St. Paul by Father Ambrose of Sienna, the latter said to the Marquise as he finished: "My opinion is that you listen more willingly to the sermons of Michael Angelo than to those of St. Paul."

The admiration which Vittoria had for Michael Angelo had no limit, and we find it expressed in all her conversations which the historians have recorded. On his side, Michael Angelo composed for her sonnets and sang madrigals, of which a large number have survived.

In 1540 a crisis occurred which, for the moment, separated the two friends. Paul III, an enemy of the Colonnas, being provoked by the reprisals on their part against the pontifical authority, Vittoria invoked the aid of Charles V to put an end to the conflict; but the Pope showed himself immovable, and hostilities broke out. Then she retired to Orvieto, and thence went to Viterbo. During her absence she composed a great number of poems, which she regularly sent to Michael Angelo, who showed them to his friends and preserved them religiously. At Viterbo she fell sick; but she said that she must die under the eyes of him who had surrounded with sweet affection the last years of her life, and whose genius added the more brilliance to her literary glory. Returned to Rome, she sought her bed once more, and on the 25th of February, 1546, drew her last sigh, consoled at this supreme moment by Cardinal Polo and by Michael Angelo, who, before quitting her forever, kneeled beside her death-bed, and, all trembling, taking her hand, already growing cold in death, pressed a kiss of adieu upon it, the first and last that he had ever dared to give to this pure and virtuous woman whom he had so much loved.

H. Mereu.

SAFE BUILDING.[1] — XXXI.



Bessemer Process. In the pneumatic or Bessemer process the carbon is entirely removed from the pig-iron by oxidation and then the necessary amount of carbon to produce the desired quality of steel is afterwards re-introduced. This seemingly roundabout method is adopted, because it would be impossible otherwise to determine promptly or exactly enough when the decarbonization should cease, the entire removal of all the carbon taking only some twenty minutes. It is easy to determine, however, when the carbon, silicon, etc., are completely oxidized, and then to introduce carbon in a known proportion which is done by adding "spiegeleisen" as hereafter mentioned. It would not be so easy, however, otherwise to know at just what point sufficient carbon was removed.

The above operations are conducted in an egg-shaped vessel open on top, known as the "converter," hung like a cannon on "trunnions," into which melted pig-iron is poured from a cupola furnace, blast or wind furnace. This converter has a perforated lining in the bottom through which a forced vertical blast, at a pressure of 20 to 25 pounds per square inch, enters and bubbles up through the molten metal. The action of this blast is distinctly oxidizing, the oxygen in the air seeming to first combine with the silicon in the pig, forming silica or quartz, which rises as slag to the top. The manganese and carbon in the pig are next consumed, the carbon passing off in gaseous combination with the oxygen and being thus eliminated. **Condition known by flame.** By the changing appearance of the "flame," which at first is of a bright yellow appearance but very turbulent and full of flying sparks, then settles to a more steady and clearer flame of pink or amethyst color, and finally settles down and disappears almost completely from the mouth of the converter, the various stages and final total elimination of the carbon are known, and at the end the blast is shut off. The metal in the converter is at this moment approximately pure iron, slightly oxidized or "burnt," and is in a spongy friable mass and non-malleable. Molten "spiegeleisen" is then poured in and its addition is accompanied by a violent boiling reaction, accompanied by a reappearance of the flame at the mouth of the converter. This Spiegeleisen is simply a German pig-iron very high in carbon and manganese of known proportions, and is so-called from its mirror-like, shiny, crystallized formation.

The object of the carbon in this addition is to turn the pure iron to steel; the object of the manganese is to take up any excess of oxygen in the melted iron by forming oxides of manganese, thus preventing the steel from being what is known as "red short" or burned.

This mixture of decarbonized iron and spiegel is allowed to rest in **Casting of Ingots.** the converter for a short time or is sometimes mechanically stirred up and then, after pouring off the slag, the contents of the converter are tipped into a ladle swinging radially on a crane-arm over a semi-circular row of ingot moulds into which the melted steel is poured from an opening in the bottom of the ladle controlled by a plug. These ingots weigh 4 to 5 tons each: they are allowed to cool as they are in the mould, or else in a "soaking pit," which is simply a device for allowing them to cool slowly on the annealing principle; this slower cooling improves the quality of the product by more thoroughly eliminating the included gases and avoiding the internal strains due to otherwise too-rapid cooling. But, as already remarked, where the blooming mill is close at hand, the ingots are not allowed to cool, but are run hot to the rollers.

The lining of the converter is usually "ganister" (silicious sand) which is of an acid (silicle) reaction and gives the name of "Acid process" to that usually adopted in this country. In England and on the Continent and presently in Alabama, where ores run too high in phosphorous and sulphur to permit of their successful use in the Bessemer process, the acid lining is sometimes replaced with a basic or alkaline lining made from dolomite, etc. The lime and magnesia in this lining unite with the sulphur and phosphorous in the pig forming a fusible slag, thus rendering their elimination possible. This expense is not required, however, with most pig made from American ores as may be inferred from the fact that it does not represent the ordinary practice in this country.

It is not necessary within these limits to explain the "Clapp-Griffiths" process, about the merits of which so much controversy **Clapp-Griffiths Process.** has been had lately, further than to state that it is an intended modification of the Bessemer process, by which it is hoped to modify and cheapen it to the point of rendering it adaptable to plants of small capacity, and also to secure a better control over the quality and *homogeneity* of the product desired.

Taking all things together, however, the superiority to-day for structural iron seems to lie with steel metal made under the Open Hearth process, (first introduced into the country by the New Jersey Steel and Iron Co.), because the results desired are under more perfect and intimate control. Ample opportunity is afforded at various stages of the process to test and duly correct the quality of the product, and a greater *uniformity* of the product itself seems to be obtained than with the other processes. For railway bars, Bessemer steel has at present largely the greater production being also cheaper and is undoubtedly well enough adapted to it, but for structural purposes, such as ships, bridges, roofs and girders, the best opinion to-day seems to incline to the preferment of the Open Hearth product on account of its superior uniformity.

But, as already emphasized several times, very little is really **Use of Steel not yet commendable.** known to-day of the properties of steel and new facts are coming to light every day. Its manufacture and determination are undoubtedly still in their development, and though events point strongly to steel becoming the metal of the near future, there exists among many reasonably conservative men, a wide and well-grounded distrust of its use in the higher engineering or architectural structures, on account of its mysterious behavior, and frequent erratic and inexplicable failures. It should never be used, except after the most rigid and frequent tests, which of course add greatly to the expense attendant on its use.

Except that being cast in large masses requiring very heavy preliminary "breaking-down" or "blooming" mills to adapt it to the finishing strains, and that usually it is not piled, its subsequent manipulation to produce the ordinary structural forms is very similar to that already described for wrought-iron.

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[1] Continued from page 42, No. 709.

The ingot, while hot, is run to the blooming-mill, and there run through rollers to form the "blooms," which are each of the necessary weight in one piece, to make a whole beam or other shape. The cross-section of the bloom is about 3 inches by 9 inches, the length depending on the weight and length of beam or other shape desired, usually from 5 feet to 30 feet, the latter weighing a little over a ton each. These blooms occupy in the rolling of steel the corresponding place to the piled muck-bar or other iron in the rolling of iron.

Rolling of Steel Bloom.

The bloom is heated in a furnace and run through rollers, which gradually shape it to its final section, the same as with wrought-iron; the only difference being that the bloom is not heated to the same high temperature as iron, and, therefore, its resistance to squeezing when passing through the rolls is very much greater than with iron. Steel plants are, therefore, not only very expensive, but the amount of breakage in housings and rolls is very great.

The Phœnix Co. are preparing to make steel stock of similar size as from the iron muck-bars, and to pile them similarly. This will probably be done in time by all the mills, and may lead to a considerable saving in the expense of replacing broken machinery.

Processes used by Mills.

The writer understands that at present the Bessemer process is employed at the Homestead Works in Pittsburgh (Carnegie, Phipps & Co.); and by the Columbia Iron and Steel Co., of Uniontown, Pa.; and by the North Chicago Rolling-Mill Co., of Chicago; and that ingots made by the Open Hearth process are bought and used by the Passaic Rolling Mills, of Paterson, N. J., and by the New Jersey Steel and Iron Works, of Trenton, N. J.; and that the latter also buy and use ingots made by the Bessemer process.

That the Clapp-Griffiths (modified Bessemer) process is used by the Pottsville Iron & Steel Co., of Pottsville, Pa.

The Siemens-Martin (Open Hearth) process is used by the Phœnix Iron Co., at Phœnixville, Pa., who roll their ingots; and that the works now building for the Pencoyd Iron Works at Pencoyd, Pa., are also for the Open Hearth process, but that they intend to hammer their ingots.

These eight mills embrace all the leading mills in the United States where structural iron and steel of I-beam, channel, angle, deck-beam or tee-shapes are rolled.

Puddled Steel.

A very cheap and inferior grade of steel, known as "puddled steel," is made by stopping the puddling of pig-iron before all the carbon is removed.

Many attempts have been made to establish exact lines of demarcation between wrought-iron, steel and cast-iron, but none are very satisfactory, though a few are here given.

Classification of Irons and Steel.

Dr. Percy says if the iron be pure, contain *no* carbon, it is wrought-iron (though practically wrought-iron contains some 0,25 per cent of carbon). In this condition the iron is soft, tenacious, weldable, but not fusible.

If the iron contains *some* carbon, from 0,15 per cent to 1,8 per cent, it is steel, the different kinds of steel varying according to the quantity of carbon; the different steels being accordingly more or less elastic, malleable, forgeable, fusible and capable of hardening and tempering.

If the iron contains *much* carbon, from 2 per cent to 6 per cent, it is cast-iron and is hard, brittle and fusible, but it is neither weldable nor forgeable.

The following (Table XXVIII) appeared originally in "*Bauermann's Metallurgy.*"[1]

TABLE XXVIII.

CLASSIFICATION OF IRONS AND STEELS.

Name.	Percentage of Carbon.	Properties.
1. Malleable iron.	0,25	Is not sensibly hardened by sudden cooling.
2. Steely iron.	0,35	Can be slightly hardened by quenching.
3. Steel.	0,50	Gives sparks with a flint when hardened.
4. Steel.	1,00 to 1,50	Limits for steel of maximum hardness and tenacity.
5. Steel.	1,75	Superior limit of welding steel.
6. Steel.	1,80	Very hard cast steel, forging with great difficulty.
7. Steel.	1,90	Not malleable hot.
8. Cast-iron.	2,00	Lower limits of cast-iron, cannot be hammered.
9. Cast-iron.	6,00	Highest carburetted compound obtainable.

Table XXVIII does not, however, agree with what is called steel in American practice. Steel with 0,12 per cent of carbon is considered "mild steel," and with 0,36 per cent of carbon "hard steel." The former is used for structural purposes. Steel with more than 0,12 per cent of carbon will not stand the tests for the Government cruisers.

LOUIS DECOPPET BERG.

[To be continued.]

[1] Copied from "*Notes on Building Construction.*"

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

INCREASING THE MEMBERSHIP OF THE PRESENT ARCHITECTURAL SOCIETIES.

CHICAGO, ILL., July 26, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— I fail to see the force of your arguments in a recent editorial on the danger of admitting members to the American Institute or the Western Association of Architects prior to consolidation. There is no reason why either society should be more lax in its scrutiny of applicants than formerly. On the contrary, the very fact that we are to have a great and national association would lead the directors and members of both associations to be more critical in their examination of candidates.

It is very natural that there should be applicants for membership at this time. It has always been a source of satisfaction to me personally that, although one of the younger members of the profession, I was present at the organization of the Western Association of Architects, and had some share in the work of its first convention. The consolidated organization is, in reality, a new society, and it is both natural and proper that architects who are as yet members of no society should seek to take part in the first convention of the new organization, rather than come in after its close. As Mr. Bloor has remarked in a communication in the last number of your journal, one of the great advantages of the new organization will be its numbers, and large membership will give the society a correspondingly large income, which will enable it to do many things that a smaller organization could not accomplish.

Again, a society can exercise little influence upon those who are not members. Therefore, it should be the aim of the new Institute to secure the membership of every architect in the United States who has shown himself reasonably competent, and who is conducting his business in accordance with its ideas of professional honor. The Institute is not to be a club for the enjoyment of a few who consider themselves the aristocracy of architecture, but it is to be a national organization, whose aim, according to Article 2 of the new Constitution, shall be "To unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession." There can be nothing improper or undignified in urging all honorable and competent architects to join such an association, and of taking advantage of occasions of exceptional interest to awaken the enthusiasm of architects on the subject of the general welfare of the profession.

The consolidation of the two existing societies will be the greatest architectural event that has occurred for some years, and it would be neglecting a great opportunity if the officers of both societies should fail to take advantage of this occasion to bring into membership of the new body those architects whose assistance would be of value. I remain, very respectfully,

NORMAND S. PATTON, *Sec'y* W. A. A.

NOTES AND CLIPPINGS

FLOOR-DEAFENING. — The communication made by Sir H. Roscoe, F. R. S., on the effect of floor-deafening on the sanitary condition of dwelling-houses, to the Royal Society, will not be a surprise to those who know the materials used by some builders for the purpose of pugging floors. Miss Etta Johnstone, University College, Dundee, and Prof. Thomas Carnelly, have found that instead of coarse mortar and smith's ashes, a mixture of a more questionable nature is used for deafening. An analysis of a number of samples from various classes of houses in Dundee have shown that the deafening contains large quantities of nitrogenous organic matter and chlorides in the old and poorer class of houses; in many cases the smell is very objectionable. That taken from floors in middle-class houses is practically free from nitrogenous organic matter and chlorides, and from any disagreeable smell. The report observes (1) that the cinders which form the bulk of the deafening in better-class houses are probably of good quality, owing to their being obtained from a non-contaminated source, whereas in the poorer class of houses ash-pit refuse and other inferior materials are used. (2) The carpets in the superior houses are not usually lifted oftener than twice a year, and, of course, the floors can only be washed at those times, so that the necessary condition of moisture for the growth of micro-organisms is not present to the same extent as in lower-class houses; while, at the same time, the carpet will act as a partial filter to micro-organisms arising from the deafening material. In the poorer class of houses the floor-boards are open-jointed, so that when the floor is washed the water can trickle down to the material, and all the household operations, as washing, cooking, nursing, etc., are carried on in one or two apartments, and the spilling of dirty water, slops, etc., cause percolation into the deafening. The air is also moist and warm. The results of the analyses show clearly that the one and two roomed houses are the worst in this respect; the highest proportion of micro-organisms being found in them, and the death-rate increases and the

meanage diminishes as we pass from the many-roomed to the one-roomed house; also that the deafening material is a source of contamination of the air in these dwellings, in that it furnishes a suitable medium for the growth of organisms, and gives off fetid gases when the necessary factors are present. We have repeatedly seen very doubtful-looking straw mixed with mortar. — *Building News.*

The Rebuilding of Naples. — The city of Naples, in Italy, began house-cleaning July 1, on a scale never before paralleled in the history of municipalities in any part of the globe. The plans contemplate the demolition of 17,000 houses and sixty-two churches in the most thickly-settled and most squalid parts of the city, where the narrow streets filled with perennial filth breed pestilence and death. It is proposed to erect in their stead well-built houses and to lay out fine broad streets. Naples is the most thickly populated city in Europe and the quarter to be thus renovated contains now a population of 108,000 or 600 to the acre. It is proposed to reduce this population one-half. All the people now residing in these slums have received notice to quit, and when the work has been completed the new buildings will probably have an entirely new set of occupants. A new street, a mile and a half long and ninety feet wide, which is twice the width of any existing street in Naples, is to be run through the district now temporarily depopulated. The cost of this immense improvement will be enormous and is to be borne largely by the Italian Government. The work to be done involves the destruction of 144 old streets and the widening of 127 others, the total or partial destruction of fifty-six *fondaci* or slums and 527 isolated groups of houses. The payments which will have to be made to the owners of the houses to be torn down for their appraised value, will alone amount to £3,750,000. Although the public inauguration of this enterprise took place over a week ago, when King Humbert and his son, the Prince of Naples, went from Rome to take part in the ceremonies attending it, the real work only began July 1, when 12,000 laborers were set to work tearing down the filthy old rookeries in the doomed quarter. This improvement, it is expected, will take four years to complete. The improvements have been in contemplation ever since the great cholera epidemic of 1884, which so thoroughly demonstrated their necessity, but it was not until two months ago that the Italian Parliament passed a bill authorizing the work. — *Philadelphia Press.*

Scientific Use of Eiffel's Tower. — At a recent meeting of the French Academy of Sciences, M. Janssen, the well-known astronomer, read a paper on some observations he had made to test the truth of the received statement that oxygen rays in the solar spectrum are due to the presence of that substance in the sun. It was known that some of these rays are due to the earth's atmosphere, but it was uncertain whether others of them might not be due to the solar atmosphere. One method of testing the question is to ascend a high mountain and observe the diminution of intensity in these rays as one proceeds, thus learning whether or not they are all terrestrial. Another plan is to analyze the rays from a powerful light giving a continuous spectrum. The light should be placed at a distance equivalent to the thickness of the earth's atmosphere in its action on the spectrum. The Eiffel Tower, with its powerful electric lamp, offered to M. Janssen these conditions. It is situated about seventy-seven hundred metres from his observatory, and the intervening air is practically equivalent to the thickness of the atmosphere toward the zenith. A collecting lens was employed to give the spectrum of the Eiffel light an intensity equivalent to that of the solar spectrum in the same analyzer. The effect was vivid, and the spectral field extended beyond A, while the group B was as bright as that from the meridian sun in summer. No oxygen band was visible, and M. Janssen concludes that the bands obey other laws than the rays. In fact, while for the rays it appears not to matter whether one employs a thickness of gas at constant density or a thickness equivalent in weight but of variable density; for the bands, on the contrary, the absorption taking place according to the square of the density, calculation shows that at the surface of the ground an atmospheric thickness of more than fifty kilometres is necessary to produce them. M. Janssen considers his experiment an approximation, but so far as it goes it tends to prove that the oxygen rays of the solar spectrum are purely terrestrial. Further experiments will, however, be attempted. — *London Times.*

A Hanging Road near Lucerne. — The cantonal authorities of the districts around Mount Pilatus have under consideration a proposal for the construction of a novel kind of road which has been submitted to them by M. Leonardo Torres, of Santander, through the Central Government at Berne. This road would connect the so-called Oberhaupt, or highest point of Pilatus, with the Klimsenhorn. The object would be to make the ascent of the mountain easier on the northern side, and to shorten the ascent of the tourists coming from Hergiswyl. The difference in level between the two points is set down at 194 metres; the distance between them at 465 metres. The road apparatus (for such it must be called) would consist of six wire cables, quite independent of one another, on which six light pulley wheels will move, and from these wheels a small omnibus capable of carrying eight persons will hang. The omnibus will be drawn by a rope attached to a steam engine to be placed on the Oberhaupt, near the Bellevue Hotel. — *Invention.*

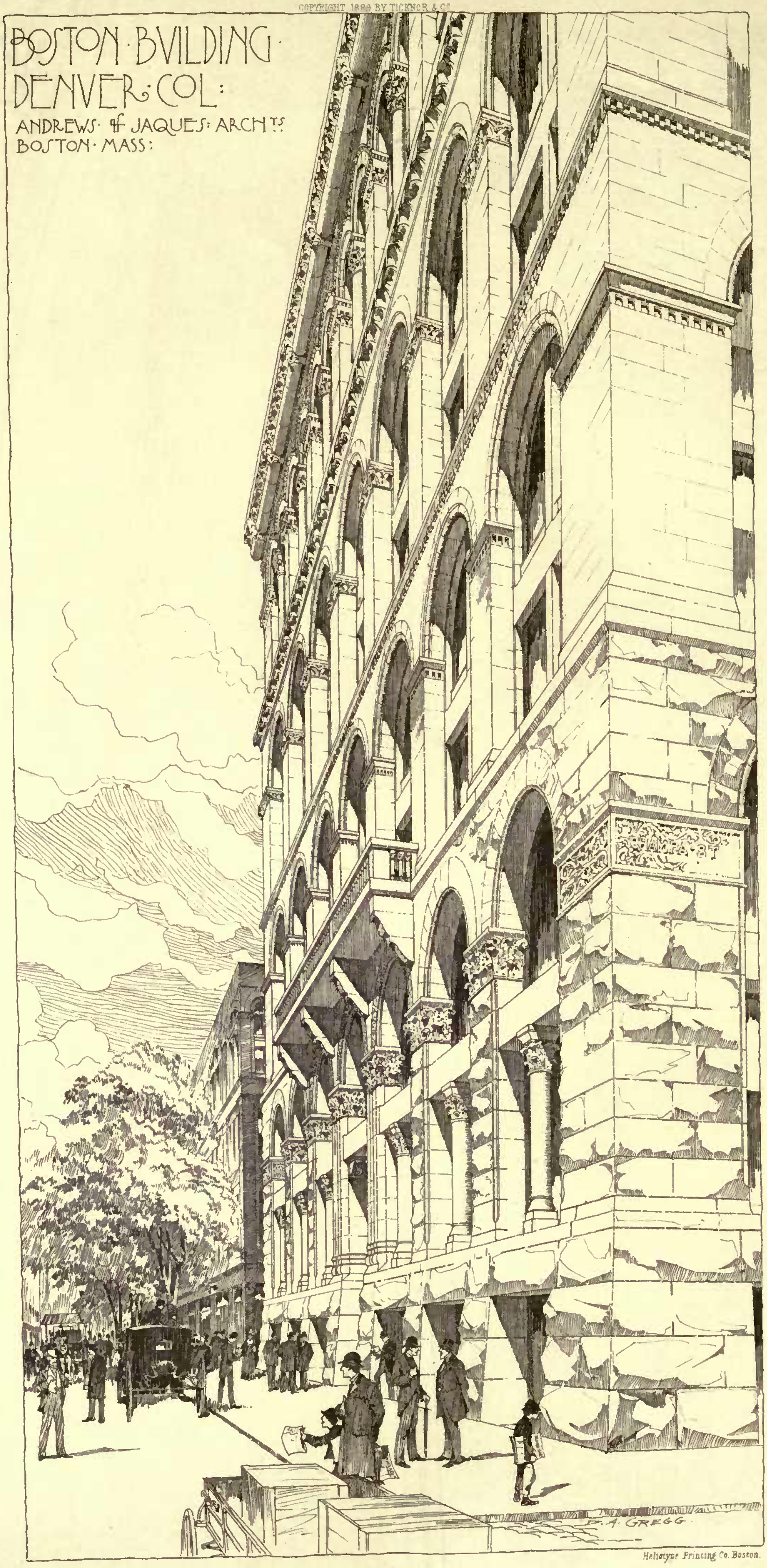
Curious if True. — Another strange circumstance is the difference in the inside measurement of walls. An architect denies it, but the carpenters find the brick lays right. Suppose two walls, carried 110 feet high, 100 feet apart, should be erected. According to the plumb bob each wall is perpendicular and as straight as a die, but it will take three inches more of lumber to build the roof than it did the first floor. Actually the walls are three inches wider on the inside at the top than at the ground-line, and contractors for high buildings also figure for it. Still, both walls are built straight skyward. The explanation is simple: The earth is round, the walls were started 100 feet apart, each built 110 feet high and straight. They are each on a different portion of the globe, and are, therefore, erected on entirely independent angles, carrying them three inches apart, with no danger of falling, because they are held by gravitation. — *Pittsburgh Despatch.*

TRADE SURVEYS

Before referring to more important and significant matters, it might be well to refer to the fact that a deep and general organized effort is being made by leading financial managers in railway circles to start a genuine stock-speculating boom. Those who are most interested in the manipulation of stocks on a large scale have been anxiously awaiting the opportunity for many months. Circumstances are now coöperating to enable them to carry out their purpose, which is to draw the outside public into speculating in railway securities, old and new, known and unknown. The railway investments, which usually run from one hundred to two hundred millions per year, have recently dropped off, for a variety of causes, several of which have been pointed out heretofore. Capital has for some time been seeking more attractive modes of investment. These opportunities, however, at their best, are merely accidental. Railroad investments must be for the future the general method most acceptable for the investment of funds. London and New York manipulators are now coöperating, and, with the aid of some of the best-known names on this side, have at least started what they hope will eventuate in a general rush of the outside public for stocks which they have long held. In connection with this preliminary effort, for which success is by no means assured, the rumor is started that a financial stringency is gathering in the distance. Those whose interest it is to contradict such a rumor refer to the fact that within the past four years some two hundred millions of legal money have been injected into general circulation, and which is now doing duty in the most profitable manner possible in the development of industrial and agricultural activity throughout the interior. The movement of the largest crops ever harvested will call for a larger supply of money in Western markets than has ever before gone that way. Considerable gold is still going abroad. Prices show a hardening tendency. A failure here and there presents some admonitory symptoms. These four points are used by the bear element to bolster up their side. In truth, neither side knows anything about the future. There are elements at work which will manifest themselves like the charge of an ambushed army at sunrise. The country's consumptive requirements are growing at a rate which even those who ought to be perfectly familiar with them will find surprising. Referring to evidence for the truth of this statement, we find it in the iron trade, which for six months past, in the language of the general iron reporter, has been dragging. Mr. Swank, of the American Iron and Steel Association, states that the production of crude-iron for the first six months of this year was the largest ever known; viz., 3,667,767 tons gross, as against 3,020.092 tons gross for the first half of last year. At the opening of the year the stocks of crude-iron were about one-half million tons, or 200,000 tons over the usual amount. Within the past three weeks, business of sufficient volume has been transacted in the various iron centres to reduce that surplus to the average amount. Further than that, the probable consumptive requirements that have loomed up within that time have not only assured iron-makers of continued activity for several months to come, but have induced a number of makers of iron to start their idle stacks.

If additional evidence of the incorrectness of the views of presumably wise men in trade and commerce is wanted, it can be found in the oversold condition of nearly all varieties of textile products. The one signal failure during the past few days is, in reality, a proof of the fact that the market is over rather than under sold, because the firm in question made lavish advances, often in excess of the value of the goods forwarded, thus showing their absolute confidence in the stability of the market. Taking Fall River as a typical centre, we find stocks there at a very low limit, considering the heavy production. The same is true of other centres of other products. Manufacturers in their anxiety to keep even with the market have fallen behind it, and the most intelligently-written market reports of textile journals show that there is an expanding demand for the better grades of nearly all lines. If there is any exception, it is in hosiery. If there is any backwardness shown in meeting these demands, it is because of unsettled conditions outside of trade requirements. As soon as the manufacturers of woolen goods know where they stand, they will know what to do. The makers of machinery are busy, and that is significant. The manufacturers of Southern plain cotton goods are introducing machinery for making finer products. The manufacturers of boots and shoes, instead of accumulating stocks as is their custom, are now simply working to demand, and, as a consequence, are obtaining a little wider margin But the tanners are complaining that they are not obtaining a share in the improvement, such as it is. Additional evidences of the mistakes of experts in their respective lines might be adduced; but it is sufficiently evident to all who are down in the ranks of trade, that for the next few months, at least, the producers will have their hands full. The iron-mills within the past few weeks have been filling up faster than they ever did before. The possible mistake that this encouraging condition of things may bring about is, that production may be stimulated to an undue degree. This little wave of revival should not be misunderstood or exaggerated. It may last only a few weeks and then depart; it may remain and increase. Its activity at this time is due to past conservatism. Its continuance will be assured by steadfastly adhering to the same policy. Among the talked-of combinations is a scheme to buy all the natural-gas producing territory of Ohio and Indiana. There is no serious difficulty in the way. A large coal-deal was entered into in Central Pennsylvania the other day, involving some two million dollars. The anthracite-coal trade is somewhat less active than a year ago among retailers, but the production of the mines is in excess of the output at the corresponding date last year. It is generally understood that an advance will be made September 1. The distribution of lumber from Southern and Northwestern points has not fallen off in the least, and the offerings of large buyers for winter supplies have not resulted in sales. The general policy of lumber dealers is to maintain prices where they are. Poplar has not recovered what it lost, and probably will not. Yellow pine and North Carolina sap have not weakened even in the face of very heavy shipments, because of the wider territory covered. Building operations show no signs of a falling off. In all the larger cities work is being pushed with accustomed earnestness. Prices for raw material are, for the most part, unchanged. Extensive building contracts are protected from fluctuations in values of material, contracts for material having been made some time ago.

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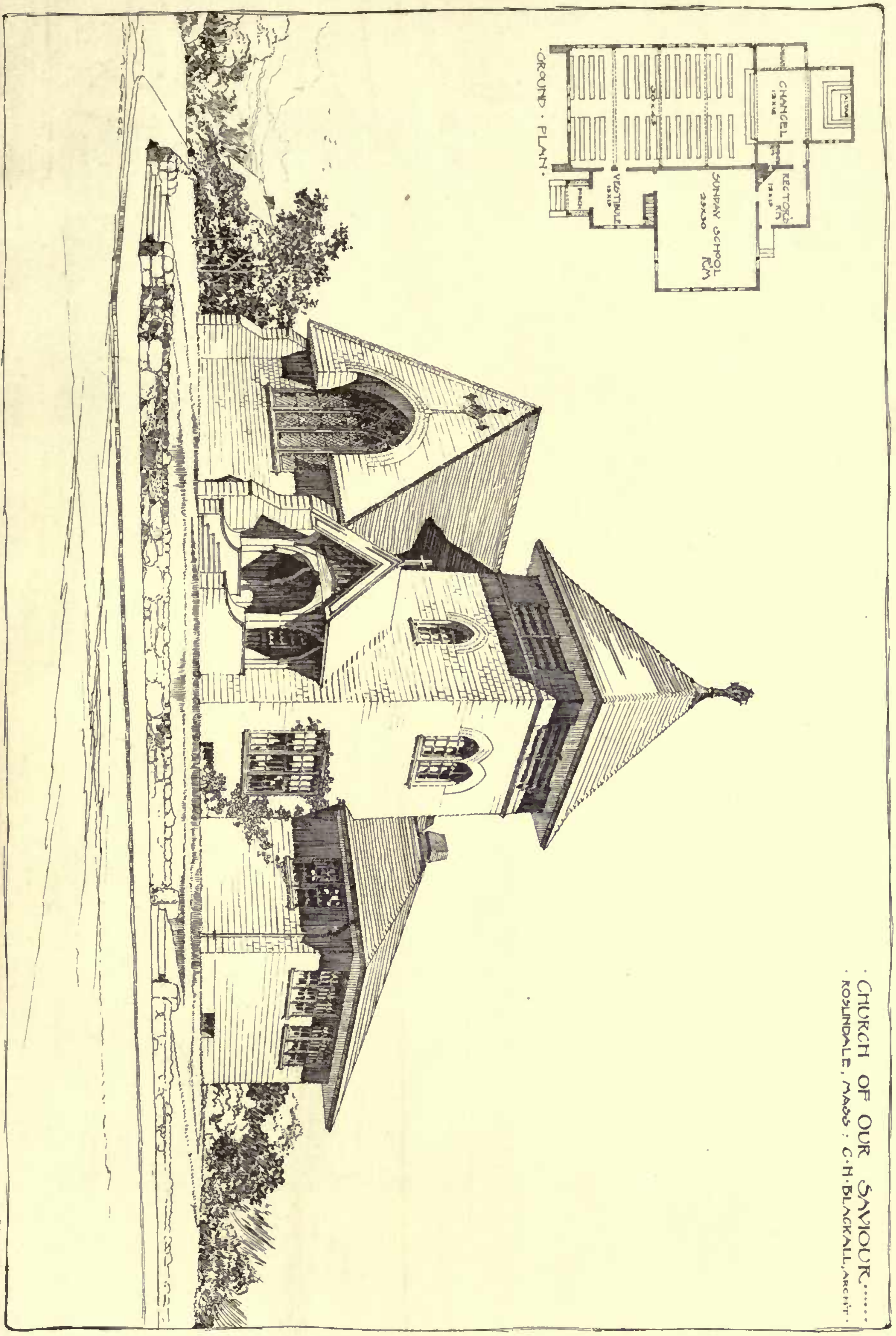
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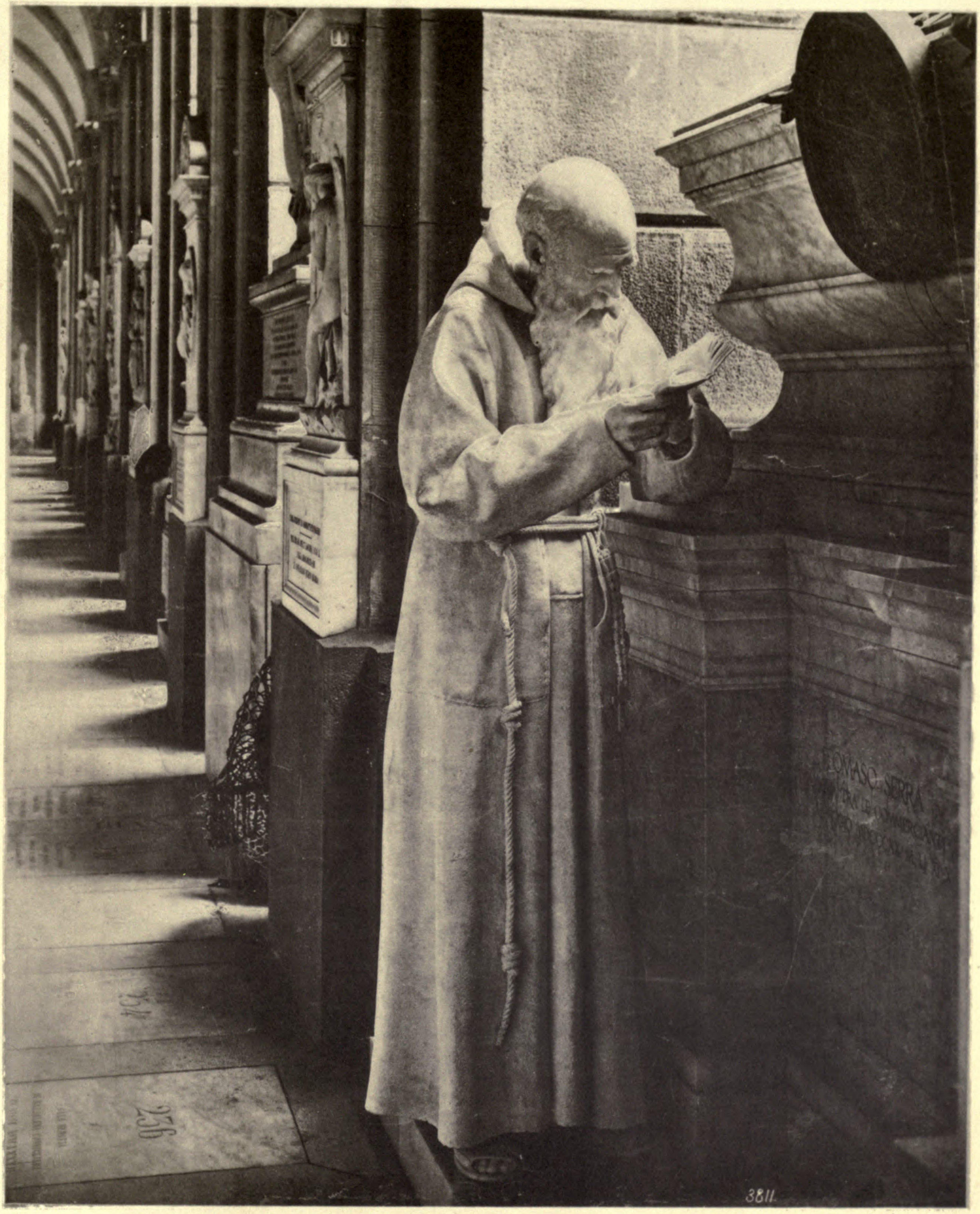


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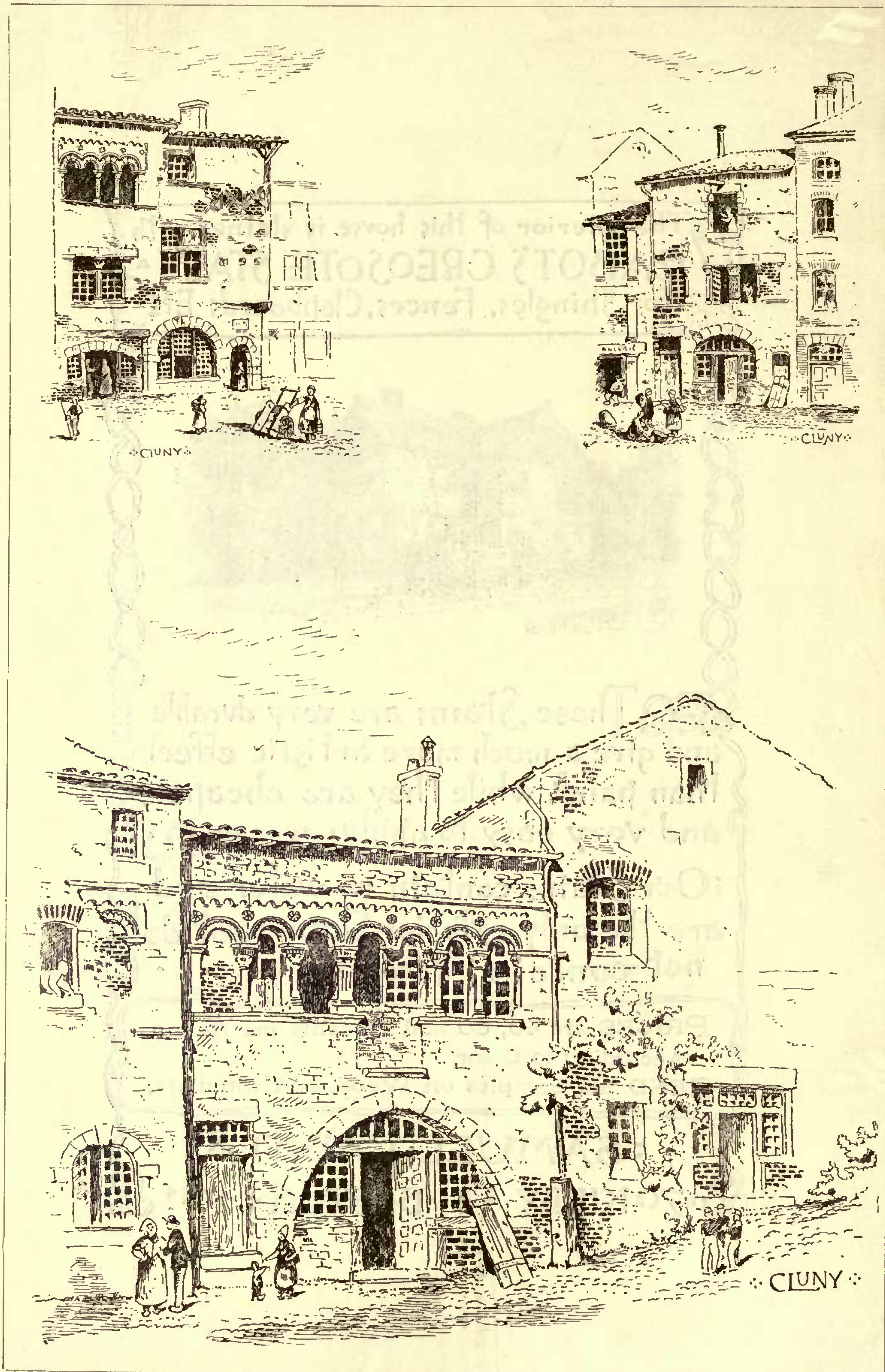
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CLUNY.

The American Architect and Building News.

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A MARITIME exhibition is to be held next fall in Boston, which will have a curious interest, particularly in a place which still cherishes, as Boston does, reminiscences of the time when McKay's clippers, Thaxter's instruments, Bond's chronometers and Cape Cod captains carried the fame of New England shipping all over the world. Now the grass grows between the paving-stones on half the wharves in Boston, and the few that find employment, except as landing-places for the little harbor steamboats, are occupied by vessels flying nearly every known flag except the American; but the older men, who still talk with pride of the Forbes rig, and go down every September to see the Burgess yachts sail away from their competitors, will go to the exhibition to see what new American ideas in navigation are waiting until the law will allow them to be put in practice; and the younger ones, who have seen their countrymen for twenty-five years shut out from maritime industries, may feel a scientific interest in studying the effect which an hour's hasty legislation may have on the destinies of millions of mankind.

A PARTICULARLY pleasant piece of good fortune has befallen the profession in Philadelphia. Mr. Joseph Donath Koeckkler, a retired architect of the city, died recently, leaving an estate valued at more than twenty thousand dollars in trust, a portion of the income to be paid during her life to the woman who nursed him during his last illness, and the rest to be allowed to accumulate for seven years, at the end of which the entire net income is to be paid over forever, in semi-annual instalments, to the Philadelphia Chapter of the American Institute of Architects, or their legal successors, "for the promotion of the science of architecture." The will specifies that the money shall be devoted to paying the salary of a lecturer on architecture, the purchase of books, and the awarding of prizes in the manner that may seem to the officers of the Chapter "most conducive to the object of improving the architecture of buildings in the city of Philadelphia." It is rather fortunate that the officers of the Chapter will have time enough to mature a plan for expending the money to the best advantage before it comes into their hands. At compound interest for seven years, the principal ought to accumulate sufficiently to produce a revenue of something like two thousand dollars a year, which will go a good way toward encouraging and instructing the young men who are to be the future custodians of Philadelphia architecture, and it is, by the way, rather fortunate that the American Institute of Architects, with its chapter organization, has not ceased to exist in the professional agitations which have been going on for the last two years. If there is ever any advantage in uprooting the product of years of experience and clearing the ground for an entirely new crop, it is certainly not found in the case of professional societies, which accumulate honor and dignity as the years go by, and, as we see, often begin, after they arrive at a certain age and respectability, to accumulate more substantial assets.

THE people who hold stock in companies for supplying water to towns ought to be encouraged by the account of the recent sale of a share in an English company of the kind. The property sold was a single share in the New River Company, which was originally formed in or about the year 1612, for the purpose of digging a canal to bring water from some springs in Hertfordshire to reservoirs in London, for the supply of the district about Clerkenwell. The canal, which was about forty-two miles long, was dug, and is still in use, but the enterprise ruined its projector, and the shares in the company, which were originally issued at five hundred dollars each, were sold for thirty years after the completion of the work for twenty-five dollars each. After that time, thanks, perhaps, to an arrangement by which the London water-supply companies agreed to restrict themselves each to a certain territory, the business began to improve, and the shares became more valuable. The managers of the company acquired or improved land both around their springs in Hertfordshire and in the neighborhood of their reservoirs in Clerkenwell, and their rents from land, as well as their income from sales of water, increased. About thirty years ago shares were sold at forty-five and fifty thousand dollars each, after having paid a good and constantly increasing interest for two hundred years, and two or three weeks ago a single share was sold at auction in London. The auctioneer, perhaps prudently, made no reference to the early history of the property, but mentioned that this single share brought in last year an income of thirteen thousand dollars. The first bid made was four hundred thousand dollars, and after a rapid succession of offers, increasing by five thousand dollars at a time, the share was sold to an insurance company for six hundred and fourteen thousand dollars.

THE history of the Paris Exposition, which *Le Génie Civil*, as the official literary representative of the affair, gives from week to week, presents some curious facts in regard to the plate-glass and mirror manufacturing establishment of Saint-Gobain. This may be said to be the oldest establishment of the kind in the world, as it descends directly from the manufactory set up in Paris, under the special favor of the King, in 1665. The original company was formed by Nicholas du Noyer, with the intention of importing workmen from Murano, then the only place in Europe where mirrors were made, to teach the French workmen the business, and among the favors which were granted by the King in recognition of the importance to his subjects of the introduction of so useful an art was the permission, extended by royal decree, to all noblemen and gentlemen to become stockholders in the company "without derogating from their nobility," besides the valuable and inexpensive privilege of writing "Manufacture Royale" on the sign-boards of the company, and the more substantial one of exemption from the jurisdiction of the courts, so that an agent or servant of the company could only be sued or tried before the King's Council. The first glass factory was set up in Paris, but a few years later the company entered into relations with a noble family of Normandy, which had set up a small shop for glass-blowing, then a new art in France. The association with the de Nehou family, which seems to have been an ingenious one, was permanent, much to the advantage of both parties, and in 1691 Louis de Nehou succeeded in making the first large cast-plates, which were silvered by the process in use then and presented to the King. The success of the experiment rendered it necessary to prepare for carrying on the process at a larger scale, and the ruined castle of Saint-Gobain, with the domain attached, was bought from the Crown, and the manufacture established which has been carried on without interruption ever since. In 1702, a new company was formed under a more advantageous charter, and the business of the original company was transferred to it. The by-laws of the new corporation contained some curious provisions.

All the stockholders bound themselves solemnly to contract no loans, and to contribute to the expenses of the business by assessments proportionate to the value of their stock. The rate of dividend was set at ten per cent, with a small fixed return per share in addition, and the stockholders were paid two shillings for attendance at meetings of the company. Under the direction of Louis de Nehou, the manufacture was carried on with increasing success, and soon after his death the charter of the company was renewed for thirty years, with all its privileges, one of which was the right to seize upon and appropriate to its use any materials suitable for its manufacture, wherever they might be found in France.

DURING the Revolution, the company went through a few trials. It had then come into the hands of some great nobles, joined with a few rich Parisian bourgeois, and Geneva bankers, but the new régime was too practical to strangle the affair all at once, so the Government contented itself with cutting off the head of the treasurer, and confiscating his property, together with that of the noble stockholders who had fled from the country to escape a like fate, and claiming a representation on the board of directors in virtue of the certificates of stock found among the plunder. Notwithstanding the lack of harmony which might be expected to exist between the old directors and the new ones who held office by such a tenure, the former did not dare to make any difficulties, and the business went on with increasing prosperity for forty years longer, when the company was reorganized, to bring it into conformity with the modern theory of manufacturing corporations. At that time, in 1830, when the property was transferred from the old company to the new one, the accounts were overhauled from the beginning, and although for a hundred and twenty-eight years they had never been audited, or even read or shown to the stockholders, they were found in irreproachable order. At present, the establishment has spread over several towns, and employs about thirty-five hundred workmen. Immense improvements have been made in the processes, so that a large sheet of silvered plate-glass costs now only about one-third as much as it did in 1873, and little more than half as much as it did in 1884. The casting and polishing are done in the same manner as in the earliest days of the manufacture, but the work is done by machinery, and the long practice has made the workmen very expert in the processes which are still left to manual labor. Every year the size of the plates which can be successfully handled increases. At the Exposition of 1878 was shown a mirror measuring thirteen and one-half by twenty-one feet, but in the present exhibition is a mirror twenty-five feet long and thirteen and one-half feet wide, besides a sheet of unsilvered plate-glass thirteen and two-thirds feet wide, and nearly twenty-seven feet long.

THE *Sanitary Inspector* makes a striking comparison between the yellow fever epidemic of last year in Florida and the diphtheria epidemic of the succeeding winter in Boston. In Florida, in a population of rather less than four hundred thousand, there were about four thousand cases of yellow fever, and three hundred and fifty of the patients, or less than nine per cent, died; yet the progress of the disease was, while it lasted, the most engrossing subject that newspaper reporters all over the world could find to talk about, and persons who ventured within the boundaries of the State were looked upon as heroes, while the final disappearance of the disease was hailed with universal rapture. In Boston, with a population of about four hundred and fifty thousand, there were, within the next few months, about fourteen hundred cases of diphtheria, and four hundred and seventy of the sufferers died, or, to put it in another way, during the winter following the yellow fever epidemic the mortality from diphtheria in Boston was greater, in proportion to the population, than it was from the fever in Florida; yet instead of quarantining themselves against the rest of the world, or rending the heavens with their prayers and wails, the people of Boston in general took only the most languid interest in the whole matter, unless the disease attacked their own families, and the health authorities, while they carried out their duties faithfully, were very far from trying even the methods for checking the epidemic which have already proved so efficient in two other cases in this country, and still farther from exercising the zeal and ingenuity in devising new prophylactics which was shown in Florida. The result was that the number of fatal cases of fever, compared with the number of persons attacked, was, we believe, by far the smallest ever known in the history of the disease, and the Florida health authorities may fairly claim to have despoiled "Yellow Jack" permanently of half his terrors, while the diphtheria epidemic in Massachusetts was as fatal as those of the dark ages of sanitation, and the people of the most intellectual State in the Union must confess that, even for the sake of saving their children's lives, they, or their delegated representatives, were incapable, not merely of inventing new weapons against the enemy, but of using those which recent sanitary experience in the West offered them. In some places in the North, any farmer on whose farm a thistle is found growing is obliged to pay a substantial fine. The causes of diphtheria, and the means for preventing its appearance, are as well understood as the methods of extirpating thistles, and we hope that the time is not far distant when the occurrence of a case, not only of diphtheria, but of scarlet fever, will involve the community in which it occurs in a heavy penalty, and will make the authorities who manage the State medicine for that community uncomfortable for some time afterward.

THE *Builder* gives an account of the early life of the late Sir James Picton, of Liverpool, which is not without its moral for architects who imagine that success in professional life is generally the result of making half-a-dozen startling sketches, and getting intimate with a newspaper reporter. Picton left school at the age of thirteen, to keep books in his father's counting-room. When his father died, not long after, he was left without resources, and almost without friends. A place was offered him in the office of an architect and surveyor, Mr. Daniel Stewart. He accepted the position, and set about making himself as useful as possible to his employer. By working hard he soon gained a knowledge of the office business, and spared no pains to do his part quickly and intelligently. When his salary was advanced to twelve dollars a week, he married, and then redoubled his efforts, not only to earn his income, but to put himself in the way of having it increased later. He would often leave his house at two or three o'clock in the morning, to get through some piece of surveying in the country, and, after taking what notes he needed, appear at the office by nine o'clock ready for the usual work of the day. In the evening, after going home, he would take the notes of his morning survey, work out his figures, and write his report, or otherwise present his results in form for use. By this sure process, he became indispensable to the business, and when his master died he succeeded to his practice as a matter of course. Just as he began to take up the full responsibility of the business, a fashion of building costly mercantile structures began to prevail in Liverpool, and his industry and natural cleverness made him one of the most successful designers in the new style. As he advanced in years and experience, his services came into great request as an expert and referee, particularly in cases where new railways were concerned, and the clearness with which his conclusions, and the reasons for them, were stated, and the firmness with which he adhered to them through any amount of cross-examination, gave him authority all over the kingdom. Naturally, so much responsibility was well paid, and he became rich, but continued to the end of his life the industrious habits in which he had trained himself. Like most clever men in England, however, he took up a hobby in his later years, which divided his attention with his business. The hobby in his case was archæology, particularly that of his native town, and he became a distinguished authority on the subject publishing many books and papers on this and similar matters. Next to archæology, his chief pleasure was in works of public advantage, and he was active in every kind of public charity. A few years ago he was knighted, in recognition of his services to his fellow-citizens, and on his death the flags on all the public buildings in Liverpool were displayed at half-mast.

AN organ has recently been put in the City-hall, at Sidney, Australia, which has the pedal pipes sounding C sixty-four feet long. These give a note two octaves below the lowest C in an ordinary piano, which has the slight disadvantage of being inaudible, as it produces only eight vibrations of the air per second. Why any one should wish to go to the expense of putting pipes in an organ to cause movements of the air which cannot be heard is not very easy to understand, but it seems to be thought that the slow movements of the air, although themselves imperceptible, give depth to the notes which are sounded in harmony with them.

BUILDERS' HARDWARE.[1] — XXX.

ARTISTIC HARDWARE.



Fig. 471. Shutter-bar. Yale & Towne Mfg. Co.

THE manufacture of fine hardware for house-trimmings has by no means kept pace with the artistic development which this country has witnessed during the past fifteen years in nearly every other branch of the art industries; so that while the mechanical details of the wares have been brought to the highest degree of excellence, the manufacture seldom rises to the dignity of an art, and seems to be considered in general as requiring no further direction than can be given by the most skilful mechanics. A trained designer, who would treat hardware as a part of a house rather than as an opportunity for mechanical elaboration, who would appreciate the relation it necessarily bears to the architecture, who would consider the fitness of the material for certain forms and the adaptability of certain styles for certain uses, without attempting to combine an Albert Durer cartouche with an Italian Renaissance scroll, crown the product with a Greek honeysuckle and apply the whole to a design for a door-plate, would have chance for employment with but few of the large firms which supply the market with builders' hardware. Consequently we find that while there is a considerable quantity of perfectly plain, unadorned hardware which is good because of its simplicity, the elaborate hardware is nearly always bad, and unfortunately most hardware is elaborate. These conditions are by no means wholly due to the indifference or artistic incapacity of the manufacturers. It is found that cheap patterns sell the best; a fussy, meretricious design is the most profitable to put on the market, and the producers are obliged to cater to the cheap trade. There are a few exceptions to this rule, some manufacturers whose average artistic productions are unimpeachable, but when such have made money it is due more to good business management and mechanical perfection than to artistic capacity. The public buys hardware because it is well-made and reliable, rather than because it is good-looking. At the same time, even the best is disappointing, because being so good, it ought to be a great deal better. With so much to draw from — the wealth of ideas in the European museums, suggestions in silver and gold smith's work, the old Pompeian bronzes, the delicate, antique Etruscan jewelry, besides the quantities of architectural ideas which might be adapted; and having in addition the best of mechanical workmanship, together with the element of color, which the work of former times seldom possessed, the hardware designer ought never to be at a loss what to do. No one of the art industries is capable of so wide an æsthetic expansion or presents so varied a field for the play of individual fancy, and few have been so persistently misapplied and misunderstood. It is not fair to say there is no good hardware to be had unless it be specially designed, but the general average of the goods which are kept in stock by the leading manufacturers, is, to say the least, commonplace; and this, too, notwithstanding some very notable exceptions.

At one time, iron was almost the only material employed for artistic effects in hardware. This was before the day of patterns, when the individual fancy was applied directly to the metal. But now, when the artist has ceased to be the workman and an article is salable only when it can be readily reproduced, cast brass and bronze are almost the only metals used. Quite recently cast-iron has been employed to a considerable extent, and when finished with the Bower-Barff process, sells at about the same prices as bronze. A defect in nearly all cast-work, however well-designed, is that the patterns, instead of being modelled by hand, so as to show every touch of the artist and permit of an exact reproduction of the feeling which a design should have when worked out in a metal like bronze or iron, is first carved in wood. One who does not appreciate the difference between a carving and a casting, has only to compare a Greek *stèle* with some of the exquisite bronzes which are taken out of Pompeii; and no workman, however skilful, can give a wood-carving the easy flow and metal-like appearance of a bronze casting. Again, our castings are, in one sense, too nice. That is to say, after they are taken from the mould they are pickled in acids and then hand-chased, a process that could spoil even the best of modelling. It is to be hoped that some day fine hardware will be cast only by the *cire-perdu* or some similar process, which reproduces every touch of the artist and leaves the casting perfect as it comes from the mould.

Glass is used more now than it was a few years ago, and for knobs is peculiarly suitable. It is not usually exhibited by the manufacturers as artistic hardware, though surely when such ugly faceted abominations are tolerated in cut-glass tableware, a cut-glass knob ought to please every one.

A rather interesting change has taken place in the forms in which artistic designs in hardware are expressed. During the Middle Ages, the greatest amount of work was expended upon the hinges and their accessories, an example of which is afforded by the hinges of the western doors of the Cathedral of Paris. Knobs and latches were quite subordinate; indeed, knobs, as we apply them now, were unknown at that time. During the Renaissance period the ingenuity of the artisans was devoted to locks and keys, some of which are most surprising examples of hardware. At present neither hinges nor locks nor keys are elaborated to any extent, the greatest amount of thought being given to the door-knobs and the plates by which they are secured to the woodwork. In collecting the samples which are illustrated in this chapter, the various manufacturers were requested to indicate which of their goods they considered as most typical of their artistic possibilities; and out of some fifty pieces so designated, all but three were door-knobs. This might be considered as indicative of a belief that knobs alone are susceptible of artistic treatment, though, in reality, there are plenty of well-designed pulls, butts, etc.; but it shows that the popular taste, when craving for art, looks at present no farther than the door-knob. And yet the first impulse of nine out of ten designers would be towards ornamental hinges rather than elaborate knobs, though with our present forms of butt-hinges there is little opportunity, and no real necessity for the long-strap hinges which form such a delightful feature of the old-fashioned doors and casement-windows. Butts are cheaper, more easily applied, and for some styles of work are more suitable, still one rather regrets the opportunities which the old style of hinges afforded.

Artistic hardware usually implies an unnecessary expense to the minds of most buyers, and unfortunately the implication is a correct one, even with very simple designs. The perfectly plain bronze, which is so much in favor in some parts of the country, is more expensive than any of the mean, contemptible figured-bronze goods which form the stock of nearly every hardware store. Plain bronze must be perfect, as every imperfection will show, whereas a criss-cross pattern will hide a multitude of sand-holes and imperfect casting. Until the general average of figured-bronze goods is higher, the architect will, therefore, have considerable difficulty in persuading his client that artistic hardware is worth all it costs. Still there is plenty of good, plain hardware which is within the means of most clients, and the aggregate cost above what the common figured work would be, is quite inconsiderable for an ordinary house. A difference of two dollars per pair on knobs would not amount to more than fifty dollars on an entire house, and the enjoyment of seeing well-chosen hardware about one's home is surely worth more than the interest on fifty dollars, or twice that sum. We, as a nation, are fast appreciating the fact that beauty is worth more than mere utility; and when the public taste demands a better average quality of house-hardware, there will be no lack of proper artists to furnish the right kind of supply.

Comparisons are always dangerous, and are apt to be invidious. There are upwards of a hundred firms in this country who make a business of supplying hardware in one form and another. It would be impracticable, were it desirable, to fairly represent the work of any considerable portion of this number, nor is it necessary in order to show the state of the market. Accordingly, a limited selection has been made from the goods of a few of the manufacturers whose reputation for fine work is not questioned, and the pieces illustrated can, at least generally, indicate what are the market possibilities. It was intended that the selection should be left to the manufacturers, so that the samples would in a measure indicate their own views as to what constitutes good hardware, but this idea was only partly carried out, it being necessary to make some personal selection so that the illustrations should not be confined entirely to knobs.

[1] Continued from page 47, No. 710.

1. The Yale & Towne Manufacturing Company. Figures 457, 458, 459 and 460 [See Illustrations] are all executed in Bower-Barffed iron. The first design, while not particularly handsome, is thoroughly appropriate to the material and would be suitable for the inside door of a public building, though rather heavy for a dwelling and not heavy enough for an outside door. The knob is perhaps a little too suggestive of wrought-iron. The next example is in a style which might be used to advantage for hardware, much more than it is, though the fish scales in the ground about the key-hole are not altogether appropriate to hardware. The next design is intended for a front door. The foliated pattern, Figure 460, is one of the best which has been made in this material. The design is well arranged and worked out, and excepting the smoothness of the surface,

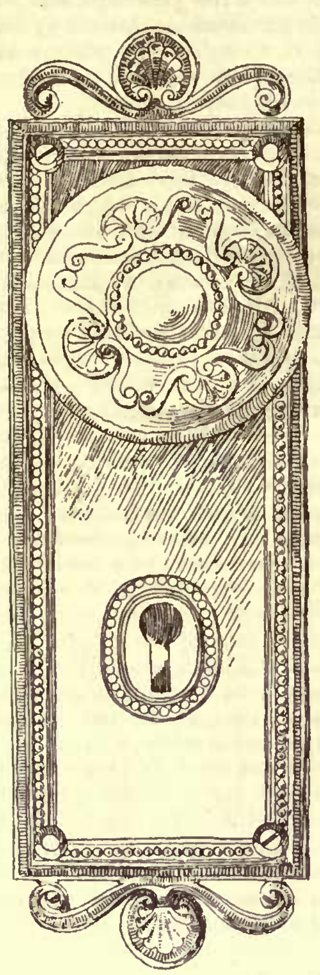




Fig. 461. Door-knob. Yale & Towne Mfg. Co. Fig. 465. Bell-pull.

which is too suggestive of the carved pattern, it is very satisfactory. Bower-Barffed iron hardware makes a very effective finish for either oak, or white paint, and has the advantage of not changing its tone with age. It is unfortunate that the illustrations cannot give an idea of the color of these samples, as with some it counts for nearly as much as the form.

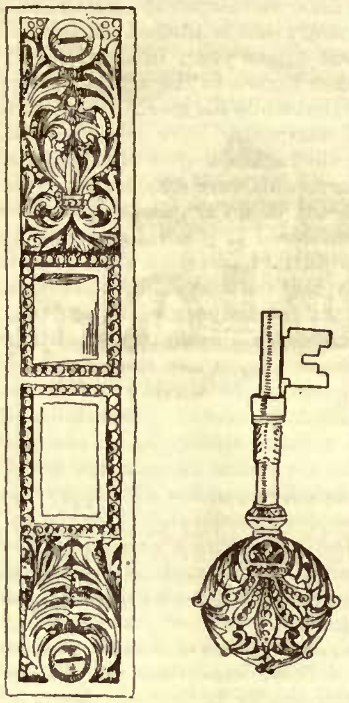
Figure 461 is a very daintily designed knob and escutcheon, finished with gold-plate, the plain surfaces being slightly dulled, and the raised portions polished so as to give brighter reflections. Another knob is finished in one of the most durable colors that is given to bronze hardware, known as old brass, having the soft yellow of an old binnacle which has been scoured and rubbed down year after year to a smooth dull but not polished surface. The big nail-heads studded over the escutcheon are very effective. Figure 461 would be suitable only for the most elaborate room, preferably one finished in ivory-white and gold, while the old-brass design would answer for much humbler apartments, looking best against dark oak, mahogany or white.

Figures 463 to 467 inclusive, are all in bronze. Figure 465 is a bell-pull, finished in deep copper color. The knob is especially well designed both for looks and for wear, the numerous rows of beads hiding any inequalities of tone and giving a rich effect at slight cost. Figure 467 is for inside work. The three others are for front doors.

Figure 468 is an elaborate drawer-pull in silver-plate, slightly oxidized. Figure 469 is in bronze, copper-plated and oxidized, the high lights being buffed down to show the copper. The design is made to match the iron escutcheon Figure 460. The shutter-knob, Figure 470, is a very neat design in a semi-Greek style which we ought to see used more frequently. The sample is gold-plated. The shutter-bar, Figure 471, the lock and key, Figure 472, and the hinge, 473, are all carried out in the same semi-Byzantine style, in oxidized-silver. The key is unique, and the only one of its kind found in modern work. Few persons would care to go to the expense implied by such keys and lock-plates, but where the money is not an important consideration, it would surely add to the finished effect of a room to have such keys as this in the lock instead



Fig. 470.



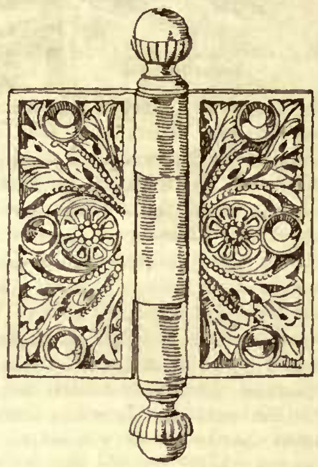


Fig. 472. Oxidized-silvar Hardware. Yale & Towne Mfg. Co. Fig. 473.

of the flat utilitarian structure one is usually content with. Figure 474 is a number-plate in oxidized-copper, the leaf work showing in dull copper tones against a very dark old-bronze ground. The number is gold-plated.

The Yale & Towne Manufacturing Company has made its name chiefly on its locks, but of late years it has included the manufacture of fine hardware. The work done by it is excellent in finish and mechanical details and the foregoing samples fairly illustrate the character of the designs.

[To be continued.]

AN ARCHITECTURAL KNOCKABOUT.[1]—IV.

FROM Naples I went to Pompeii, after having procured permission from the Italian Government to make sketches there. The government is very strict in this respect, and I had a hard time in procuring these permits. I had no passport, but, on exhibiting the only documents on my person which looked important, namely, my letter-of-credit and my visiting-card, I accomplished my purpose. I found that the Italian officials seemed to think that a letter-of-credit on any of our banks had as much significance as the "glorious eagle" on the *bona-fide* passport. However, after having proved conclusively that I was an architect by my sketch-books, and in spite of my having been caught making a caricature of a blustering old officer, I was at last successful, and prepared for my visit to the dead cities, Pompeii and Herculaneum. Naples, architecturally, was totally devoid of interest to me, and that is not to be wondered at with Rome, Pompeii, Herculaneum and Pæstum so near at hand—all replete with such wonders.

Arriving at Pompeii, at a little bit of a station made of lava-stone, I asked a good-looking brigand where the Albergo del Sole was. He offered to pilot me. I said I only wished to be informed of its whereabouts. Nothing would satisfy him but to walk by my side, repeatedly begging me to allow him to take my knapsack, but without success. I arrived at this little hotel, which was built, I should say, entirely of cement.

The old "padrone" was a queer specimen of a man. He wore a red Tam O'Shanter and spoke good French, but not a word of English. All the travelling artists stay there. I was shown to my room (a great square tomb of a thing, and cold as "Greenland's icy mountains"). It contained a cot-bed, placed directly in the track of a flow of lava from old "Vesuve," whose fires I could see from the window of the establishment. I discovered, also, that the walls were all decorated by the different artists who had been there, with

[1] Continued from No. 710, page 51.

their names attached to their work — Pompeiian scenes, caricatures and what not! I was asked to do likewise, and to this day, I suppose, on the east wall of this room, is a humble sketch of mine, descriptive of some Pompeiian scene, and I should have always a peculiarly happy feeling if any one told me he saw it there. The



The Albergo del Sole, Pompeii.

padrone and I soon became great chums; indeed, he took a fatherly interest in me, and warned me against temptations of all sorts. I was never to go out after dark, and by all means never to wander far alone in the direction of Pæstum, far-famed for its brigandish disposition. I promised to be careful.

The next day, I, with several Americans and English who had lately arrived, made the ascent of Vesuvius, riding to the very base of the old furnace, and then walking the remainder of the way. We were met by various guides, who offered in a pitying tone their ropes to aid us in our ascent, saying that we looked tired. We refused them indignantly, but were all the time dying to grasp hold of these friendly aids, just the same.

What a climb! Every two steps we took in the ashes we would slip back one. Arrived at last at the summit, we had luncheon, and examined the crater with its sulphuretted mouth and poisonous breath. Again and again it would heave and send up showers of small stones and soft lava as it did in the time of Pliny.

We walked for about twenty feet into the mouth of the crater with our handkerchiefs tied over our mouths. It looked very mighty and grand, and as one looked down and saw continually the flash of that dangerous flame indicative of subterranean fires, and walked from rock to rock in order to avoid the still flowing lava, one felt anything but comfortable. It was with no small feeling of relief that I commenced the descent of the mountain by the way known as the "ash path." Here, at a signal from our guide, we commenced to trot; the trot soon turned into a run, and from that to continual flying leaps, landing us up to our knees in the soft ashes below. Notwithstanding all this, the descent was glorious fun. The air was very clear, and kept us so buoyed up that we felt no fatigue. Our descending leaps were so tremendous that we simply flew straight out into the air and landed far down the side of the cone. It was a queer sight to see all of us rushing like mad down the mountain-side. There was no such thing as stopping, and in less than five minutes after we started we were at the bottom. It is only superfluous to try and describe the ascent and descent of Vesuvius. We've had it in all its forms, so I'll to Pompeii.

Most travellers take one day to make the ascent of the mountain and half a day to go over the ruins of Pompeii, and then "clear out" as fast as they can. I did not follow this example because the place itself had the greatest attraction for me; so much so that I concluded to stay there a week. This arrangement enabled me to make a great many sketches.

On speaking to the padrone, he informed me that, as I was an artist, the price of living there would be but three francs a day if I stayed a week. This had its effect, and I decided to remain. Like everybody, I am fond of a horse, and although the poor little beasts that carry a man up Vesuvius cannot, with any due respect to that noble animal, be called horses, still I decided to hire one of these apologies for the week I was at Pompeii. On asking the price of a pony for the time I contemplated remaining, I was informed that I could have one for ten lires, or two dollars of our money. This was almost startling, and I closed the bargain at once.

Each day I would rise early, eat my breakfast and have put up a lunch of great "hunks" of bread and chicken, and, with my sketch-books and bottle of wine strapped to my back, would fling my leg over my little quadruped and start off for a day's wandering. I soon became known to the people (probably by the queer figure I cut). I would go each day all around the country: now to Torre Annunciata, then to Herculaneum, Castleamara and Sorrento — each day by a new and strange route.

The padrone had again cautioned me not to ride towards Pæstum, and I had given him the impression that I would not, but on the last day of my stay there I decided to reach Pæstum or die. As for the talk of brigands, it did not bother me at all.

I had a love of adventure, and to go to Pæstum and be accosted by a real live brigand in these nineteenth-century days had a charm not to be easily shaken off. So giving orders for the preparation of my luncheon for the next day, and that my charger should be curried



My Pony rests.

and fed with an extra centime's worth of oats and brought around to my quarters at an extremely early hour, I retired. Awakened at four o'clock, I sallied forth in the glorious morning, no one suspecting my proposed destination. I rode all day, stopping now and then to make a sketch. My little beast was only too ready to be quiet, and would sleep away an hour or so, standing stock still all the while. This was no wonder, as he was so small that my feet nearly touched the ground. I want to say one thing about that animal: his one great fault (which he often indulged in) was to stop at any stump or convenient boulder and deliberately sit down upon it. I always had to wait until he was sufficiently rested to continue. About four o'clock in the afternoon I neared the vicinity of the temple of Neptune. It was getting late, and I thought I saw it from a hill whose summit I had reached. Having gone through a mile or two of dense Italian woods, I stopped to cut a stick to accelerate the movements of my steed, and then decided to go back to Pompeii, as it was so late that even with my greatest speed I could not arrive at the Albergo del Sole till nearly eleven o'clock. I then began to realize for the first time my position. No one was near me; no one of my



Neptune.

friends knew where I was; what would prevent my being "laid out" here by some kind band of brigands and thrown into a bush? And who would have been the wiser? In this way I worked myself into a squeamish state of feeling and resolved to "put" for home. Acting upon this intention, I had dismounted and was emerging from the bush where I had been cutting the stick above mentioned when, to my surprise, and, I must say, trepidation, a live wood-chopper or brigand strode calmly forth from the dense copse close by. He had evidently been chopping fagots, as a great bundle of sticks was under his arm.

I suppose that he had watched me from his ambuscade, and seeing that I was alone and apparently an unarmed foreigner — also looking small and harmless in my knickerbockers — thought he had a great catch. I politely wished him "good-evening" and walked towards my pony. So did he. "Now," I thought, "if there were any chance that by jumping on the poor little beast's back and digging my heels into his sides I could 'cut and run,' I'd do it." But, as the pony was so sleepy and used up, there was no "run" in him, I gave it up as a bad job, and resolved to await events. I was smoking the old pipe I had brought with me from home, and which gave me the appearance of a certain amount of unconcern. I knew something had to be done at once, so I determined to take the bull by the horns. I pulled from my pocket one of those sinful rat-tail-like cheroots from which you have to pull the greater part of a whisk-broom before you can smoke it and gave it to him. He smiled, took

it and lighted the same. I wondered why he didn't go home. Then he, evidently wanting to make his task as short as possible and as agreeable to me as he could, said in honeyed words — not moneyed ones — "*Aura*," which, interpreted, meant my worldly possessions. Ah! it had come. I replied in my best Italian that "*aura*" was a thing of the shadowy past with me, and that I was without a sou. This made him impatient, and, seizing the bridle of my pony, who blinked at him again kindly, he repeated his demand. I again refused and resolved to be bold, frightened to my wit's end all the time. So I started towards him, whereupon he transferred his grasp from the pony's bridle to my collar and commenced a sort of Italian garrote. This was fearful, so I politely asked him to let go. My breath was fast leaving me. He was so near and so easy to hit that I struck him in the old place — the under-jaw — and knocked him down. I was terrified at what I had done. I stood "stock-still," with my hands clinched at my sides and my pipe in my mouth.

To this day I have the dear old thing, with a hole bitten clean through the stem. Then the villain jumped up and with a most awful look tore open his coat and seized his great tree-knife. I fastened a gaze upon him in which I flung every muscle of my body, if such a thing were possible. As he sprang savagely at me my own dear home came before me in an instant. I offered, however, no show of defence, for what was the use, I argued. If I ran, I would surely be cut down or struck from behind. I probably did the best thing under the circumstances — I steadily watched him. He approached me nearer and nearer, with his murderous-looking weapon raised aloft, but stopped as suddenly as he had started, his knife being but a few inches from my breast; then, with a most awful curse, he turned and rushed back — back through the woods from whence he had come.

Silently I walked to my horse. I bowed my head on the saddle and sobbed like a child for fully ten minutes. It was a terrible strain upon my nerves. I then mounted the little animal and went slowly home. It was nearly morning before I arrived back in Pompeii, and my friends had become greatly alarmed at my prolonged absence and had sent messengers to look for me everywhere. I said little or nothing in explanation, except that I was delayed by the rain, which had been pouring all the night. I was not myself for a great many days after this adventure, and have thanked Heaven a great many times for that lucky something (whatever it was) that made my brigand postpone his carving process.

F. L. V. Hoppin.

[To be continued.]

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

MASONIC BUILDING, PITTSBURGH, PA. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued only with the Imperial Edition.]

A MODERN PALACE, GENOA, ITALY.

THE CAMPO SANTO, GENOA, ITALY.

THIS and the above mentioned plate were to have been included in the last issue as illustrations of the "Architectural Knockabout," then published; but this was prevented by an unavoidable mishap which occurred at so late an hour that we could make no explanation or apology last week.

ARTISTIC HARDWARE, MANUFACTURED BY THE YALE & TOWNE MANUFACTURING CO., STAMFORD, CONN.

For description see article on "Builders' Hardware," elsewhere in this issue. It should be noted that, for the sake of making these several articles balance better in the combination as printed, Nos. 458, 459 and 460 have been printed upside down.

BUILDING OF THE NEW YORK LIFE INSURANCE COMPANY, MONTREAL, CANADA. MESSRS. BABB, COOK & WILLARD, ARCHITECTS, NEW YORK, N. Y.

This building on the Place d' Armes is built of red granite up to the water-table and above this level of Gatelawbridge Scotch red sandstone.

MEMORIAL TOWER. MR. ARTHUR TRUSCOTT, ARCHITECT, PHILADELPHIA, PA.

This design was submitted in one of the competitions of the T-Square Club and received a first mention.

FIRST SKETCH FOR ST. JOHN'S CHURCH AND SUNDAY SCHOOL, FALL RIVER, MASS. MESSRS. WHEELWRIGHT & HAVEN, ARCHITECTS, BOSTON, MASS.

CITY-HALL, LOS ANGELES, CAL. MESSRS. HAAS & CAUKINS, ARCHITECTS, LOS ANGELES, CAL.

HOUSE FOR A. H. HINKLE, ESQ., CINCINNATI, O. MR. H. E. SITER, ARCHITECT, CINCINNATI, O.

SAFE BUILDING.[1] — XXXII.



Classification of Structural Iron and Steel. IN Table XXIX the writer has attempted to classify systematically the various kinds of iron and steel used in buildings. The table has been largely based on a similar table prepared for the *Stevens Indicator* by Mr. William Kent.

Manganese is frequently used instead of carbon to harden steel, it hardens it considerably (though not so much so as carbon) and does not reduce its ductility as much as carbon.

Chromium and tungsten are added to and produce very hard but yet ductile steels, but add considerably to the expense. Chrome steel being used largely for fine tools and vault-works. While cast-iron can be melted at 2732° F. and cast-steel at 3500° F., wrought-iron is practically not fusible. **Mitis.** By adding, however, some ½ to 1 per cent of aluminium to wrought-iron its point of fusion is reduced some 300° to 400° F. and it becomes practicable to melt it. This is done in crucibles of fire-clay or plumbago and in petroleum furnaces. The product is a comparatively new metal and known as *mitis*. Its resistance to tension is about one-fifth greater than that of wrought-iron, while its ductility is about the same.

Resume of Qualities. In "*Notes on Building Construction*" is given such a very able short résumé of the difference between cast and wrought iron and steel, that it will be given here with but slight modifications.

"The great differences in the characteristics of cast-iron, and wrought-iron and steel, are briefly recapitulated below, and these determine the uses to which they are respectively applied.

Cast-iron. "Cast-iron has little tensile strength, but affords great resistance to compression.

"It is hard, brittle, wanting in toughness and elasticity, and gives way without warning, especially under sudden shocks or changes of temperature. It is easily melted and run into various shapes.

"The castings thus produced are liable to air-holes and other flaws, which reduce their strength. Small castings are stronger in proportion to their size than large ones." Castings should be of even thickness throughout and all sharp angles should be avoided.

"Cast-iron can be cut or turned with edge tools, but is not malleable either when cold or hot, nor is it weldable.

"It is not so easily oxidized in moist air as wrought-iron. In salt water, however, it is gradually softened and converted into plumbago.[2]

"Cast-iron is peculiarly adapted for columns, bedding-plates, struts, chairs, shoes, heads, and all parts of a structure which have to bear none but steady compressive strains; also for gutters, water-pipes, railings, grate-fronts, and ornamental work of nearly every description.

"It has been much employed for girders, but is an untrustworthy material for those of large size, or in important positions. It is liable to crack and give way without warning under sudden shocks, and also under extreme changes of temperature, such as occur in the case of buildings on fire, where the girders may become highly heated, and then suddenly cooled by water being poured on them." For lintels of short span it is used on account of the ease of adapting it to any condition. The main objection to the use of cast-iron

[1] Continued from page 55, No. 710.
[2] Or dissolved.

is its brittle and unreliable nature, danger of flaws, and danger of snapping in case of fire and sudden cooling by a stream of water.

Malleable Cast-Iron. "Malleable cast-iron possesses originally the fusibility of cast-iron, and eventually acquires some of the strength and toughness of wrought-iron. It may be used for heads, shoes and other joints in roofs, and for all articles in which intricacy of form has to be combined with a certain amount of toughness.

Wrought-Iron. "Wrought-iron has many most valuable qualities, though these differ considerably as to degree in different varieties of the material.

"Its tensile strength is three or four times as great as that of cast-iron, but it offers not half the resistance to compression.

"It is, however, very tough and ductile, and therefore gives way gradually instead of suddenly snapping.

"Its elastic limit is equal to about half its ultimate strength, and it will bear repeated loads below that limit without injury.

"Wrought-iron is practically infusible, is malleable hot and cold, is weldable at high temperatures, and can be forged into various shapes.

"It is subject to 'hot and cold shortness' produced by impurities, and to other defects. Large sections are more likely to contain flaws than small ones. Bars are, as a rule, stronger than plates, and plates are stronger with the grain than across it.

"Malleable iron rusts quickly in moist air, but stands salt water better than cast-iron.

"The great tensile strength of wrought-iron leads to its employment for tie-rods, bolts, straps, and all members of any structure which are exposed to tensile stress; it is also much used for members which undergo compression," particularly if very long compared to their diameters, or if exposed to fire. "It should be employed for all important iron beams and girders, especially those exposed to sudden shocks. In its various forms it comes into play in a variety of ways in roofs, braced girders, and iron structures of all kinds. Corrugated sheets are much used for roof coverings.

Hard and Soft Steel. "Steel differs even more than wrought-iron in the characteristics of its several varieties.

"It has a high tensile strength, much greater than that of wrought-iron. Its resistance to compression is also much greater. Moreover, it has a harder surface, and is better able to resist wear and tear.

"Hard steels, containing a large proportion of carbon, are fusible, easily tempered, have a high tenacity and elastic limit. Their resistance to compression is enormous, especially when they are tempered, but they cannot be easily welded or forged, are brittle, and very uncertain in quality.

"Soft mild steels have a tenacity and resistance to compression, and an elastic limit somewhat" (proportionately much) "higher than wrought-iron. They can be hardened and tempered, but not easily. They are weldable and easily forged, and afford a very (?) reliable and ductile material adapted for structures subject to sudden shocks.

"Steel is more easily oxidized than wrought-iron, and far more easily than cast-iron.

"Steel is at present hardly used at all by the builder. Sometimes bolts," pins, "and cotters are made of steel for large roofs.

"It is not adopted for engineering structures to anything like the fullest extent of which it is capable, but is required by the engineer for tools, rails, boilers, machinery, wheels, etc., and is coming into use for some of the larger roofs and bridges."

Forging and Welding. The process of welding different pieces of iron together is a very important one and as it occurs frequently should be well understood and carefully watched. All iron to be forged to any shape should be thoroughly heated to an almost white heat, but not too much for fear of burning it; the heating should be as uniform as possible and the iron should be worked as quickly as possible. The heat destroys the fibrous nature of the iron, and crystallizes it, but the fibres are again restored by hammering. Care must therefore be taken to thoroughly hammer all parts. All angles should be avoided in forgings. Welding is the same process as forging, except that two separate parts are joined together. The metal in each is heated and the two are thoroughly hammered together. It is very easy to weld two pieces of wrought-iron together, as the iron becomes sticky at a comparatively low temperature. Pieces of steel can be welded together if both are low in carbon. Those high in carbon cannot be welded. Iron and steel can be welded together if the steel does not contain too much carbon. Where the amount of carbon contained in the two pieces to be welded varies, the one with least carbon should be heated to a greater temperature than the other. With cast-iron no welding is possible. Welded joints in tension are considerably weaker than the original metal.

Welded Steel and Iron. Sometimes layers of steel and iron are piled together, heated and rolled out into one mass, called three-ply steel and iron, five-ply, etc., according to the number of plates in the pile. These are used for safes and vault-work; after being rolled the steel is tempered or softened, the iron not being affected by the process. The plates are now fitted, drilled, etc., and then are hardened, when it becomes impossible to drill them on account of the extreme hardness of the steel layers, nor can they be broken by sledge hammers or hydraulic rams, on account of the elasticity of the iron layers, which are not affected by the hardening process.

Hardening and Tempering Steel. In hardening steel the colder the water and the more suddenly the heated metal is plunged into it, the harder will be the quality. By using oil for the cooling plunge instead of water the steel is less likely to crack or warp during the process. To remove the brittleness from hardened steel it is tempered as already explained, by reheating it to a much lower temperature, however, than before, and again plunging it in a water bath to cool or allowing it to cool slowly. Hardening steel adds greatly to its tensile strength and increases the limit of elasticity, but on the other hand greatly reduces its ductility.

Softening or Annealing Steel. To soften very hard steel it is annealed, that is, heated to a red heat and then allowed to cool very slowly in an annealing oven. The latter is a brick air-tight chamber in which several pieces of heated steel are placed to cool. The process of cooling is, of course, very slow, as the heat is retained by the brick walls and the radiations of heat from the different pieces greatly retard each other in cooling. In this way steel can be made to regain its original softness.

Case Hardening. "Case hardening" is a process by which wrought-iron retains its tough and elastic nature but changes only its external skin to a depth of from $\frac{1}{16}''$ to $\frac{3}{8}''$ into hard steel so as to better resist wear and tear from external causes. This is accomplished by placing the iron in a box with bone dust and heating it to a red heat; it is kept thus for from half an hour to eight hours, according to the depth of skin desired and then quenched in cold water.

If the whole is to remain malleable it is not quenched in water but allowed to cool very slowly which leaves a skin of soft or mild steel.

TABLE XXIX.

Classification of Structural Irons and Steels.

GENERIC TERM	IRON.								
HOW OBTAINED	CAST or obtained from a fluid mass.					WROUGHT. or welded from a pasty mass.			
DISTINGUISHING QUALITY	Fusible, but non malleable.	Fusible and slightly malleable.	Fusible and malleable.			malleable but practically non-fusible.			
SPECIES	CAST IRON	CAST STEEL	WROUGHT STEEL.			WROUGHT IRON.			
VARIETIES	Ordinary Castings.	Ordinary Castings.	Crucible—Open Hearth—Bessemer (*Steel ingots cast from fluid mass.*)			Puddling Balls. (*made from pasty mass of refined pig iron.*)			
DEVELOPMENT	Malleable Cast Iron. (*made by annealing in oxides.*)		Steel Bloom (*made from ingot by rolling or hammering, when hot.*)			Muck Bar or Iron Bloom (*made by rolling or hammering puddling ball when hot.*)		Case Hardened Iron. (*made by annealing in bone dust.*)	
FINAL STATE	Cast Iron.	Malleable Cast Iron.	Cast Steel.	Forged Steel (*made by hammering when hot.*)	Rolled Steel (*made by rolling when hot.*)	Welded Steel and Iron (*made by rolling steel and iron together, when hot.*)	Forged Iron (*made by hammering when hot.*)	Rolled Iron (*made by rolling when hot.*)	Case Hardened Iron.

This is worked as desired and on completion the whole is re-heated and quenched suddenly, which hardens the steel skin, but does not affect the iron interior.

The protection of iron after erection is a very important subject to the architect. If iron is exposed to the air, particularly alternating damp and dry air, or to wet mortar, it will surely rust unless protected. Rust means the gradual scaling, corrosion, and crumbling of the whole. Cast-iron is the least liable to rust; wrought-iron, however, is very liable to it, and steel even more so. In cast-iron the skin formed during the cooling of the metal by fusion with the mould sand and absorption of gases, is not only supposed to give great strength to the metal, but offers its best protection against the weather. When this is removed or damaged, the iron is not only supposed to be greatly weakened in strength but it is certainly very much more liable to rust.

Protection from Rust.

Rust is like a disease, and must be entirely cleaned off the metal before covering it, or it will continue to eat its way in. Where sand-paper is not sufficient for its removal, a bath of diluted sulphuric, muriatic, nitric or other strong acid should be resorted to.

All parts which are planed and are to make exact joints, and cannot, therefore, be painted, should be kept carefully covered at all times until erection with a heavy coating of lard and white lead mixed.

Metallic Paints.

All iron and steel pieces should be so designed that all parts are readily accessible for painting. For this purpose it is usual to use any of the so-called metallic paints, which are made mainly from earths rich in iron ore (red oxide of iron). A heavy coat of this should be put on immediately after finishing, first removing all loose scales. In practice, however, this is rarely done, as it is found cheaper by the iron contractor to do his own painting, rather than to pay the mill price. The architect should insist, however, that every speck of rust and all loose scales be cleaned off before any painting be done, and should not be talked out of it by the so-called practical man (who always has plenty of "pocket judgment").

In place of metallic paints, a mixture of red lead and linseed oil makes an excellent protector, but is rather more expensive than most metallic paints, as it does not cover so much surface as the latter. Some authorities claim that lead paints set up galvanic action with the iron, and so injure it. On the other hand, if the metallic paint is made from a protoxide of iron, instead of red oxide, it is said it will rust within itself.

Finishing Paints.

There should never be less than two coats of metallic or red-lead paint on iron before attempting to finish same in colors, bronzing or gilding. It will take at least two additional coats of white lead and oil paint in colors to hide the color of the metallic paint. These two additional coats should also be put on under and before bronzing or gilding. Bronzing is done on interior work only, and is done by painting with a mixture of bronze powder and varnish. In gilding, the paint is covered with a coat of the usual oil gold-size, and then the hammered gold-leaf is put on.

Galvanizing Process.

Iron is frequently galvanized, which gives it an effectual protecting skin so long as this remains intact, and is not cracked or broken by bending or blows. This skin consists of a thin coating of zinc. The iron is first cleaned by being soaked in a weak solution of sulphuric acid, is then sand-papered and washed. After this it is dipped, while hot, into a bath of chloride of zinc and then "plunged into molten zinc, the surface of which is protected by a layer of sal ammoniac."

Tarring Process.

In many cases, particularly with cast-iron pipes, the iron is tarred. This is a very good protection for the iron, but is apt to cover up and hide defects, such as sand-holes, etc.; for this reason the use of tarred pipes is sometimes prohibited, notably by the New York City Board of Health. The iron is heated to 700° F., and dipped into a mixture of coal-tar, pitch and five per cent to six per cent of linseed oil, heated to 300° F. The iron is left in it till it acquires the temperature of the mixture, when it is removed. In practice, the iron is usually dipped into the mixture without the preparatory heating.

Japanning Process.

Sometimes iron, notably registers and hardware, is japanned. This consists in painting the iron with a mixture of lead-paint, oil and copal varnish, with successive coats of copal varnish, all dried at a very high temperature.

Electro-plating Process.

Sometimes iron is protected and beautified by electro-plating. This consists of depositing on the iron in an electric-bath successive, but very thin, layers of brass, copper, bronze, etc. These effects are very beautiful, but expensive.

Bower-Barff Process.

The Bower-Barff process turns the outside skin of the iron into a magnetic oxide of iron, the color being of a very beautiful dark blue-black, and susceptible of a high polish. The iron is thoroughly cleaned and put into an air-tight chamber, and kept at a very high temperature. Superheated steam, or air heated to a very high temperature, sometimes as high as 1600° F., is then passed over the iron for from five to seven hours.

The effectiveness of this coating to resist rust depends upon the length of the exposure in the oven and the height of the temperature.

Iron Cement.

A strong cement for filling poor joints between ironwork under compression is made of sal ammoniac, iron filings and sulphur. The more iron used in proportion to the other ingredients, the slower will the cement set.

Re-melting Cast-iron.

It is frequently attempted to get extra-strong irons or steels by re-working them. In cast-iron, as a rule, re-melting, within reasonable limits, increases the strength of the iron. Box gives one case where the second melting added some forty per cent to the original tensile strength of the pig-iron; the third melting added some fifty per cent to this, or more than doubled the original strength; and the fourth melting added another twenty per cent to this, or the metal became about two and one-half times its original strength (tensile). On the other hand, Mr. Fairbairn found that the transverse, tensile and compressive strength of cast-iron was reduced gradually to the third or fourth melting, then increased with each melting till they reached their maximum at about the twelfth melting, and after that again decreased very rapidly. Accordingly, if the strength of the pig-iron were = 1,0 the third melting (second after pig) would give a minimum transverse strength of 0,82 and a minimum tensional strength of 0,77; while the maximum transverse strength 1,41 and the maximum tensile strength 1,32 would be reached at the twelfth melting.

With compression, the minimum strength 0,92 would be reached at the fourth melting, and the maximum 2,18 at the fourteenth re-melting. According to Gauthier's analysis, re-melting turns gray irons to white, decreases the graphitic carbon and the silicon, and increases the combined carbon, thus rendering the iron weaker in resisting tensile or transverse strains, but stronger in resisting compression.

However, the whole subject is very uncertain, the increase or decrease of strength by re-meltings depending evidently on the particular mixture of iron used. A test in each case would be the only reliable criterion. It must be remembered, too, that re-meltings mean much additional expense.

If cast-iron be kept melted in the furnace for a long time — from one to three hours — it can be greatly increased in tensile strength, some experiments showing nearly doubled strength.

Cold-blast iron seems to be stronger than hot-blast (in tension), varying with the temperature of the test piece, the cold-blast iron being nearly twenty-five per cent stronger than iron made with a blast at 250° F.

Effect of Thickness.

Mr. Thomas Box has collected all the data obtainable as to the effect of thickness on cast-iron, and from them is obtained the formula:

$$t_1 = \frac{t}{\sqrt[2,3]{b}} \qquad (100)$$

Where b = the least thickness of a casting, in inches.

Where t = the ultimate tensional stress, per square inch, of a similar casting, whose least thickness is one inch.

Where t_1 = the ultimate tensional stress, per square inch, of a casting, whose least thickness is b inches,

and

$$k_1 = \frac{k}{\sqrt[2,3]{k}} \qquad (101)$$

Where b = the least thickness of a casting, in inches.

Where k = the ultimate modulus of rupture, per square inch, of a casting whose least thickness is one inch.

Where k_1 = the ultimate modulus of rupture, per square inch, of a casting whose least thickness is b inches.

Proportionate Strength of Castings.

Accordingly if the transverse or tensional strength of a casting one inch thick be = 1,0 we should have:

For	½ inch thick	= 1,350
For	1 inch thick	= 1,000
For	1¼ inch thick	= 0,907
For	1½ inch thick	= 0,838
For	1¾ inch thick	= 0,783
For	2 inch thick	= 0,739
For	2½ inch thick	= 0,671
For	3 inch thick	= 0,620
For	4 inch thick	= 0,547
For	5 inch thick	= 0,497
For	6 inch thick	= 0,459
For	7 inch thick	= 0,429
For	8 inch thick	= 0,405
For	9 inch thick	= 0,385
For	10 inch thick	= 0,367

According to Hodgkinson the tensile strengths of cast-iron bars 1″, 2″ and 3″ thick would be as 1,0 is to 0,8 and to 0,77 or slightly more than the above. Louis DeCoppet Berg.

[To be continued.]

Strange Death of an Artist. — A curious accident, which unhappily has since proved fatal, befell M. Boutet, an artist, residing in the Avenue Victor Hugo, recently. M. Boutet was working in his studio, when, inconvenienced by the sun, he asked his *bonne* to get on the roof and pass a light linen covering over the glass. As the woman was arranging this awning she slipped, and falling through the glass, alighted on the table at which her master was seated. Oddly enough, she sustained no injury worth mentioning. M. Boutet, however, was not so fortunate. A piece of the broken glass struck him on the neck, severing an artery. He tried to stanch the blood, and failing, ran out of the house in the direction of a neighboring druggist's shop; but he fell down fainting ere he reached the place, and two hours afterwards he breathed his last. — *London Times.*

Comparative Table Illustrating E. T. Potter's System[1] for Concentrated Residences.

[The subjoined statements recapitulate and so complete the discussions of the subject of the best use that can be made of urban territory for house building which have appeared in the pages of the *American Architect* at intervals during the last ten years.]

Differentiation of this System from Systems heretofore in use.[2]

CONCENTRATION: —

1. *In Rows.*

It allows of being Built in Rows; *i. e.*, with each Dwelling enclosed between two others.

This differentiates this System from: — All "detached" or "semi-detached" dwellings; such as most Farm-houses, Country-houses, Villas, and other rural and suburban dwellings in the United States, British Kingdom or Colonies, and parts of Continental Europe.

2. *In Stories.*

It allows of Placing Families one over the other in Stories.

This differentiates this System from: — All dwellings intended for but one family under one roof.

HEALTH: —

3. *Direct Light.*

It gives Direct Light in every Room.

This differentiates this System from: — All dwellings which contain any rooms lighted solely from other rooms, or from "shafts" or "wells" of light.

4. *Good Air.*

It gives the best Air at the Site.

This differentiates this System from: — All dwellings which have any rooms which get air solely from other rooms, or from close-bottom courts, shafts, wells, etc. Which air is therefore liable to be foul, because stagnant, or vitiated, or bearing smells or germs of disease, etc., from other dwellings opening into the same shaft or court.

5. *Thorough-Draught.*

It has a through and through draught of air at command through every Dwelling.

This differentiates this System from: — All dwellings whose windows all face in one direction; or which from any cause, lack command, at pleasure, of a through and through draught of air.

6. *Sunshine.*

It gives Sunshine in Every Dwelling.

This differentiates this System from: — All dwellings which, from their position or plan, are deprived of sunshine in winter, or throughout the year.

7. *No Overshadowing.*

It provides against Overshadowing from similar Buildings.[3]

This differentiates this System from: — All systems of planning of groups of buildings in which the prevention of harmful overshadow from similar buildings is not considered and provided against.

8. *Conformable to the Health Laws of New York.*

It Conforms to the Health Laws of New York.

This differentiates this System from: — All plans which, however otherwise excellent, cannot be made to conform to the letter, as well as the spirit, of the Health Ordinances of New York.

COMFORT: —

9. *Privacy.*

It furthers the Privacy of each Dwelling: by providing it with a private Dumb-waiter and, in connection with it, two private Cellars (one for food, and one for fuel), and a private clothes drying and bleaching space; by the absence of corridors; and by the prevention of overlooking from the windows of adjoining dwellings.

This differentiates this System from: — All dwellings which lack these, or compensating, aids to privacy; and differentiates it in proportion to such lack.

10. *Laundry Facilities.*

It gives private Laundry facilities to each Dwelling.

This differentiates this System from: — All dwellings which lack private facilities for washing, drying and bleaching.

11. *Quiet.*

It furthers quiet by the absence of Corridors or open stair-wells; and by the enclosing of entrance ways.

This differentiates this System from; — All buildings which have longitudinal or other extended public corridors or passages on each floor, or have open stair-wells; and from buildings, the dwellings in which are approached through open courts, *cités*, alleys or slums.

12. *Allows of Elevators.*

It allows of Elevators communicating on each story, like the stairs, with two (or sometimes three) dwellings; [also of using one general Elevator for mounting to an upper floor, and thence descending, by the stairs, to any dwelling].

This differentiates this System from: — All buildings where the use of an elevator necessitates having public corridors on each floor, whereby quiet and privacy are lessened, and having dwellings with rooms facing in opposite ways, so as to command thorough-draught, is prevented.

13. *Sea-Breeze.* (In New York.)

It allows, in New York, the Sea-breeze to enter every Room.

This differentiates this System from: — All rooms in New York, whether in tenements, flats, apartments, or private houses, which do not have, or do not open into rooms which have, windows facing south, or southeast, or southwest.

RECREATION: —

14. *Play-Ground.*

It provides a Play-ground in the open air with every house, for the use, in common, of the Children of all the families residing in it.

This differentiates this System from: — All tenements, flats, apartments, or houses, which provide no playing-place for the children of their occupants except the dwellings themselves, or the public halls and corridors, and stairs of approach to them, or else the public streets, or nearest public square, or open spaces.

15. *Garden-Bed.*

It gives a private Garden-Bed to every family.

This differentiates this System from: — All dwellings which lack this feature.

APPEARANCE: —

16. *First-class Approach.*

It gives a first-class Approach to every Dwelling.

This differentiates this System from: — All dwellings the approach to which indicates by size or position, inferiority of means or social position in their occupants.

PRACTICABILITY: —

17. *Separate Ownership.*

It allows of Separate Ownership of each Dwelling; and of securing of the same by small weekly payments.

This differentiates this System from: — All dwellings and plans for dwellings in which the character of the plan, or the approaches to the different rooms and suites of rooms or other circumstances prevent or do not lend themselves to, separate ownership of the separate dwellings.

18. *Suits New York Lots.*

It can be used on New York Lots.

This differentiates this System from: — All dwellings, or plans for dwellings which, like the Peabody Houses in London, cannot be repeated on New York lots without waste of land, or else a radical change in the character of the plan.

19. *Available Everywhere.*

It can, in some of its forms, be made Available Everywhere.

This differentiates this System from: — All plans suited only to corner lots, or to lots of certain dimensions: — or to local, or national, customs or requirements.

USEFULNESS: —

20. *Meets Pressing Needs.*

It meets pressing needs for Comfortable Housing for all Classes in New York, or wherever population is dense.

This differentiates this System from: — All plans for housing only certain classes (e. *g.* the "working class"); or plans which (as in the laying out of the streets in Philadelphia) practically tend to separate as to streets and neighborhood, those of different means, and so lack (however otherwise admirable) availability for future general use.

21. *Provides a Way of Avoiding New York Tenement House Evils.*

It provides a way of avoiding the Tenement-house and Apartment-house evils hitherto prevailing in New York, which are bred there and elsewhere, by the exclusive employment of an inflexible system of deep close-back lots.[4]

This differentiates this System from: — All plans of, or for, Improved Tenement-houses or Apartment-houses, in New York or elsewhere, which lack the features of this System named above as factors, Nos. 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, and 16.

[1] System: Any complexure or combination of many things acting together. A scheme which reduces many things to regular dependence and coöperation. — *Johnson's Dictionary.*

[2] In an intermittent, but almost constant, study, in several countries, of this subject, since circumstances, over thirty years since, called his attention to the mortality, suffering, and discomfort consequent on the lack of thorough-draught, or even proper air or light in the bed-rooms of New York tenement-houses, the author has found no buildings, or plans for buildings, uniting the factors which he has here tabulated and combined in a System.

[3] (See section on diagram illustrating this System in the *American Architect and Building News*, October 15th, 1887.)

[4] [See Circular by the author: to whom it may concern, December 20th, 1876.]

THE FAYUM EXPLORATIONS.



SOME five or six miles distant from Illahûn, on the other side of the Bahr Yusûf, Mr. Petrie discovered the remains of another town, less remotely ancient, but of a highly interesting period, everything found in the ruins being of the latter end of the Eighteenth Dynasty or the early part of the Nineteenth Dynasty. Like the little town at Illahûn, it is all of one period, the houses never having been rebuilt, but standing on the desert sand as first erected, with the upper parts of the walls falling in, and the ruins choked with dust, sand and rubbish. Here, too, the town is surrounded by a wall, and just outside the wall, lies the necropolis. The modern name of this place is Tell Gurob, the ancient name being as yet unknown. The cartouches of Thothmes III, on a sculptured block, a porcelain ring stamped with the titles of Tutankhamen, and another with the titles of Horemheb, give the earliest royal names discovered, and mark the beginnings of the place under the Pharaohs of the great Eighteenth Dynasty. It continued to flourish through the reigns of Rameses I, and Seti I, and began probably to decay in the time of Menepthah, the supposed Pharaoh of the Exodus. In the reign of Seti II, who was a son of Menepthah, and grandson of Rameses II, it was already deserted and in ruins. The cemetery, however, like the cemetery of the Twelfth Dynasty settlement at Illahûn, continued to be in use long after the town had ceased to be inhabited, Mr. Petrie having there exhumed mummies of many different ages, from the Rameside to the Ptolemaic periods. These last are mostly decorated with head-cases and breastplates of what is technically called "cartonnage," like the mummies from the Hawarak cemetery exhibited by Mr. Petrie last year at the Egyptian Hall in Piccadilly. This "cartonnage" which, as an ancient Egyptian manufacture, dates from the Eighteenth Dynasty, is, as a rule, composed of from twenty to forty thicknesses of coarse linen glued and pressed together, and coated with a thin layer of stucco. Not so, however, the cartonnage head-cases of these Ptolemaic mummies at Tell Gurob, which have yielded one of the most unexpected of Mr. Petrie's recent results. We give the story in his own words from a journal-letter dated the 16th of March: "A most curious find is a new source of papyri. The cartonnage head-cases so common here, are built up of papyri, with a thin wash of plaster over all. The layers of papyrus can be easily separated by soaking and are none the worse. I get in this way a quantity of Ptolemaic documents in pieces as large as one's hand, some being fragments of royal decrees beginning, 'King Ptolemy to ——, greeting,' etc. One head contained an ephemeris, or daily record of court affairs and regulations of the fourteenth year of Ptolemy Philadelphus. There are also some curious letters; among others, part of an epistle from a youth at college, telling his father how he is getting on, and saying that he now understands mensuration and can draw a plan of a house. Another letter is from one of the royal gooseherds, stating that he cannot supply twelve geese for King Ptolemy's festival."

There does not at present seem to be any clue as to where these people lived who were buried at Tell Gurob in Ptolemaic times; but the mere fact that waste papyrus was so abundant as to be sold to the undertakers for funerary cartonnages shows it to have been an important centre, and probably a royal residence. Be this as it may the moral pointed by Mr. Petrie's discovery will not be thrown away upon the keepers of Egyptian departments in European museums.

Some of the finest bronzes in the way of domestic objects ever found in Egypt have been discovered this year by Mr. Petrie in the town rubbish at Tell Gurob. These consist of knives, chisels, axeheads, mirrors and the like; the gems of the series being two beautiful shallow pans measuring respectively nine inches and fifteen inches in diameter, by two inches in depth. These are described by Mr. Petrie as "triumphs of hammer work," and so thin as to be quite elastic and bendable, although they have thick rims. Both are inscribed on the side in hieroglyphic characters, the smaller pan to the "Ka" of one Kheraa, and the larger to the "Ka" of one Seti, a royal scribe attached to the palace of "the great lake." These dedications show them to have been votive offerings, and of a funerary character. An abundance of ordinary domestic objects, such as wooden combs, netting-needles, pottery, balls of thread, and scraps of jewelry of Eighteenth and Nineteenth Dynasty type have also been found in the town.

But all the rest of Mr. Petrie's discoveries of the present season, including even his harvest of Twelfth Dynasty papyri, fade in comparison with the interest of a series of most extraordinary alphabetic signs incised upon the pottery of the Twelfth Dynasty at the little settlement of Illahûn, and upon pottery of the Eighteenth and Nineteenth Dynasty at Tell Gurob. The pottery of the Illahûn settlement, as already stated, is *sui generis*, and decorated with patterns imitating basket-work. The Tell Gurob pottery is partly of the Cypriote and partly of the Mycenæan types. The styles of the two towns are as distinct as the periods to which they belong. The characters incised upon them have, however, this much in common — that they are neither hieroglyphic nor hieratic. In a word, they are not Egyptian, but apparently very early Cypriote or Greek. Moreover, the signs traced on the Twelfth Dynasty pottery are distinctly Cypriote, while Phœnician also is found upon the later pottery of Tell Gurob. This revelation will not appear so incredible to Egyptologists as to Greek scholars, the presence of Ægean Greeks in Egypt being recorded as early as the time of a king of the Twelfth Dynasty. But that these prehistoric islanders should have settled in the little town of Fayûm in the time of the Usertesens and Amenemhats, bringing with them, at that remote date, the rudiments of the Cypriote and perhaps also of the Phœnician alphabets, may well surprise not only classical but Oriental scholars. At Tell Gurob, the evidences of a foreign settlement are overwhelming. All the weights found in the ruins of the town are of the Assyrian standards; and in the cemetery have been found interments of an alien race with yellow hair and foreign names. On one mummy-case we find the name of a man called An-Tursha, the Tursha as a nation, having long been well known to us through Egyptian inscriptions as allies of the Achæans and Lybians against Egypt. Another figure is inscribed for one Sati-amiu — a name which has a decidedly Semitic flavor. That Mr. Petrie's conclusions should be accepted without the fullest examination of the evidence, and before the objects in question have been viewed and discussed by scholars of all specialties, is not to be expected. But the pottery with its strange inscriptions, the mummy-cases of the alien colonists who were buried at Tell Gurob, the weights of Asiatic standards, and even the yellow locks of Tursha and his kin are on their way to this country — have perhaps already been landed — and will soon be exhibited to the public.

Of a wonderful tomb also opened by Mr. Petrie at Hawara, and of the finding of a mummy literally covered from head to foot with jewels and gold, we have now no space to tell. But to have unearthed any amount of "barbaric pearl and gold" is as nothing compared with a discovery which shows that the beginnings of the alphabet were already in existence some 2,000 years before the Christian era, and which proves that the Iliad might, after all, have been committed to writing in the lifetime of Homer.

It should be added that the result of Mr. Petrie's excavations are duly submitted at the close of each season to the authorities of the Boulak Museum, and are subject to such claims as may be made by the director on behalf of the National Egyptian Museum. All the finest bronzes, statuettes, jewels, amulets, etc., as well as the alabaster table of offerings from the pyramid of Amenemhat III, and the most valuable of the mummy-cases, have this year been detained at Boulak.— *London Times, July* 20.

SOCIETIES

BOSTON ARCHITECTURAL CLUB.

THE Boston Architectural Club made an excursion to Newport Saturday, August 3, going down by the early morning train, and reaching Newport at 11.30. The residence of Mr. Cornelius Vanderbilt was first visited. Mr. Vanderbilt received the members personally, accompanying them over the house and grounds. A visit to Mr. Van Alen's house was next made, accompanied by the architect, Mr. Dudley Newton, and later in the day the party went to Mrs. Turnbull's house, under the direction of Mr. Newton. After lunch the party visited the Channing Memorial Church, the Casino and a number of private residences, and then made the entire tour of the cliff walk, ending with an inspection of the new bath-house at the bathing-beach. The return was on the New York Limited *via* Wickford Junction, the dinner being served on the cars. The occasion was a very enjoyable one, and the twenty-eight members that formed the party passed a hearty vote of thanks in appreciation of the courtesies extended by Mr. Vanderbilt and Mr. Newton. The party arrived in Boston at 11 P. M.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

INCREASING THE MEMBERSHIP OF THE PRESENT ARCHITECTURAL SOCIETIES.

NEW YORK, N. Y., August 5, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Mr. Normand S. Patton, Secretary of the Western Association of Architects, in your issue of the 3d inst., puts the case lucidly and altogether well, from one point-of-view (taken, I dare say, by as many practitioners as another view by the rest), as to the admittance of candidates to that organization or to the American Institute of Architects before the consolidation of the two bodies is perfected in detail at their approaching joint convention. Personally, I think his view of the case just about as tenable as that which

sees in the pending status a temptation for either society to "be more lax in its scrutiny of applicants than formerly," or than will be the case after their unification shall be completed.

What the profession needs to become, a united, powerful and persistent force, which must be respected *per se* and reckoned with — what it absolutely requires to be put *en evidence* before the community and before the federal, State, county and municipal legislatures, which it rightfully seeks to influence in the public's interest — is, as Mr. Patton so clearly points out, a representative society, the "large-membership" of which, with "a correspondingly large income, will enable it to do many things that a smaller organization could not accomplish," and which no single one of them ever has accomplished, and which, moreover, never can be accomplished till the whole reputable portion of the profession is united, under the same general laws, as one man, for ever-needed defence and often-needed (while sometimes feasible) attack against the common enemy — Philistinism.

I hope, therefore, that Mr. Patton's letter will be well read by our architects, and that it will exercise all the influence it deserves. He will, however, I hope, permit me to note that one of his statements is apt to give a wrong impression. When he says that the aim of the Institute (after the consolidation is finished), "according to Article 2 of the new Constitution, shall be 'To unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession,'" the hasty reader (and most readers, in these days of crowded competition and steam and telegraph, are hasty) will undoubtedly suppose that such a rule of action has been absent from the regimen of the existing Institute, whereas the provisions he quotes are but the repetition, word for word, of the precise article on which the Institute has based all its action during the last thirty years. Moreover, this original declaration of the Institute has been adopted *verbatim* (and most wisely so, for, in my opinion, it is incapable of improvement) by every one — so far as I have observed — of the numerous architectural organizations which have sprung up, in every corner of the union, during the last few years — organizations which, while proving the wealth of material throughout the country available for a powerful national fraternity, constitute, at the same time, legitimate outlets for that local pride which is as necessary as it is becoming in the citizen of any State and the resident of any district, and are also the best and often the only convenient vehicles for sympathetic *camaraderie*, for mutual improvement and for defence against Philistinism, though, of course, they are quite inadequate to deal with the last beyond their own circle, and even within that are comparatively defenceless, as they must continue to be till they can cover themselves with the ægis of a body equal to national organization and coördination, and yielding them — for citation to clients and fellow-practitioners — the support of uniform regulations, confirmed by governmental and legal authorities, and, consequently, recognized and accepted by the public.

Yours truly, A. J. Bloor.

THE CHARGE FOR PRELIMINARY SKETCHES.

Chicago, Ill., July 29, 1889.

To the Editors of the American Architect:—

Dear Sirs, — Can you give me some recent decisions relative to collecting fee for preliminary sketching, and oblige

Yours truly, W. D. C.

[We do not know just what our correspondent means to ask. If he wishes to know whether the one-per-cent rule is accepted in the courts, we must answer that it seems to be of much less authority than the custom of five per cent for full services, if, indeed, it has ever been directly admitted, which we doubt, and a referee would be likely to use his own judgment in assessing the value of the work done. As to whether anything can be collected, the nature of the contract between the architect and his employer must decide, as shown by the evidence. — Eds. American Architect.]

THE STRENGTH OF A CHURCH FLOOR.

Marshfield, Wis., July 28, 1889.

To the Editors of the American Architect:—

Dear Sirs, — The floor of a church, building in this vicinity, has been constructed as follows: Wood beam, 10″ x 12″; floor-joist, 2″ x 12″, 16 inches from centres; double floor and ceiled on under-side of joist; size of floor supported on each column, 16 x 18 feet. This floor is supported on column of gas-pipe 6 inches in diameter, ¼ inch metal, 9 feet long, with cast-iron cap at top and bottom. Question: Is the column sufficient to support the floor? You will very much oblige an old subscriber of your magazine by replying in your columns. Respectfully yours,

Chas. Willson.

[If the gas-pipe columns have spreading bases and caps, well screwed on and at right angles with the columns, and if the bases are well bedded and the caps screwed or bolted to the girders, they are much stronger than the floor. If they are carelessly made, or badly put together, they may be weaker than the floor, but the girders would be likely to fail before the columns.— Eds. American Architect.]

NOTES AND CLIPPINGS

Angle of Rest for Dry Sand. — A Mr. Bolton in recent visits to Egypt and Mount Sinai measured the maximum angle at which dry sand will lie at rest, and found it to be from thirty-one to thirty-two degrees; higher than this it will move down the slope. This does not accord with the well-known formula in text-books. — *N. Y. Herald.*

A Large Mill Chimney. — The tall chimneys erected by the Hargraves and Globe Yarn Mills now bid fair to be eclipsed by one being erected at the Fall River Iron Works Company's mill. The experts on the heights of chimneys say that it will be the second highest in this country. Instead of hoisting the brick and mortar on the outside, as is commonly done, an elevator is being built to run up the interior of the chimney. It is to be run by a hoisting engine by means of a wire cable. As the work progresses the guides for the elevator will be erected inside, and the overhead work moved upward. There will be 1,500,000 bricks used, and the total cost will not be far from $10,000. The work on the foundation is completed. It contains 2,000 tons of Fall River granite, held together with 700 barrels of Portland cement. The bottom stone is eight feet below tide water, and the top one is eight feet above. The total height of the chimney above the level of the ground will be 340 feet. The pressure on the foundation stones will be two and a half tons per square foot. At the base the stack will be square, but about 20 feet from the ground the corners will be sloped away and the whole affair will rise in circular form into the air and in general outline will seem like a gigantic baseball bat. Away up in the air the chimney will be crowned by a terra-cotta cap, each section of which will be five feet thick. Other dimensions are: Diameter at base, 30 feet; diameter at head, 25 feet; diameter at smallest part, 15 feet 4 inches. The flue will be 11 feet in diameter. — *Fall River, Mass., Globe.*

Prehistoric Remains found in the State of Chiapas. — Recently returned explorers from the State of Chiapas confirm and add to the remarkable reports concerning important archæological discoveries. A fine broad paved road, built by prehistoric inhabitants, has been traced from Tonala down into Guatemala and thence in a curve up again into Mexico, terminating at Palenque. All along this road are still to be seen the remains of ruined cities, and the careful estimate of the population of these places is about thirty millions. On that part of the road near Palenque the ruins are of great magnitude. Houses four and often five stories high have been found in the depth of the forest. Many of these houses are pyramidal in form and so covered are some of them with vegetable mould that large trees are growing from the roofs. In some of the houses great employment has been made of stone beams of tremendous weight, and the architecture indicates a high degree of scientific attainments. In some houses visited bronze lamps have been discovered, and the interior and exterior mural decorations of the more important houses cousist of panellings filled with elaborately-carved figures almost life-size, two types of men and women being represented, some plainly Egyptian and others genuine Africans. In front of one of the houses the explorers found fourteen sculptures of gods with folded arms. The work of exploration was one of extreme difficulty, owing to the density of the forest and the unwillingness of the Indians to enter the ancient edifices, they averring that the buildings were inhabited by spirits. Another discovery was that an enormous paved road extends from Palenque across Yucatan to the island of Cozumel and is continued on the island. The explorers went to Chiapas on private business, but incidentally became interested in the work of exploring the ruins, and they suggest that the Government fit out an expedition to make a complete map of this wonderfully interesting region, regarding which little comparatively is known, even after so many years since the white men became aware of its existence. Palenque explorers assert that they have discovered in the edifices before mentioned examples of a perfect arch. One explorer is a scientifically-trained man who has recently arrived from India, and by his account the region from Chiapas to Yucatan must have been the seat of a densely populous nation. — *New York Times.*

The Corrosion of Iron in Structures. — Attention has frequently been directed to the large amount of corrosion which wrought-iron undergoes when unprotected from the influences of an acid atmosphere and rain-water. Mr. Charles Cochrane referred to the subject in the course of his inaugural address as President of the Institution of Mechanical Engineers, and instanced the wasting exhibited in bridges constructed on the Thames. In these instances he considered the deterioration was aggravated by the acid condition of the atmosphere, due to the presence of sulphurous acid from the combustion of coal as well as to the customary percentage of carbonic acid. In the course of 25 years bolts have been eaten away from an original diameter of 5-8 of an inch to one of 5-16 of an inch, being a reduction in area of 75 per cent, or from 0.31 to 0.08 square inch, and this in a portion of the structure where the brackets of an overhanging footpath were supported in part by the decaying bolts. Wherever the rain trickled over the face of the girders to which the brackets were attached, the same evidence of deterioration was manifested in the scaling of the plates; pointing both to the necessity of preventing water from coming in contact with wrought-iron, and of periodically examining and painting structures of this material. Another illustration of insidious destruction of iron was named. This was the case of a wire rope at a colliery, kept in reserve to wind men up and down the shaft in case of ropes breaking or of other accident preventing the due use of the winding shaft. While at rest the emergency rope was subject to the drip of rain at the same spot for some years, from the roof of the engine house. External examination was strict, and the rope was regularly greased, as is customary. At length a man riding up the shaft was

killed through the parting of the rope at the point exposed to the rain drip, and the wires internally, were found to have been corroded to the size of drawn-out needle-points. From these and other considerations, it is evident that too much care cannot be bestowed upon the protection of wrought-iron in exposed positions, more especially as there is a growing tendency to diminish the allowance made for corrosive action in designing wrought-iron structures. — *Mechanical World.*

Jasper. — Within two years the jasper industry has been developed and there are now four quarries, employing nearly 1,000 men, in operation about Sioux Falls. The market extends from Chicago to Kansas City. Sioux Falls streets are paved with jasper, and her four-story buildings are constructed of it. The stone is susceptible of a high degree of polish, and when finished looks much like the red granite of Missouri. The pioneers in the jasper industry discovered not long ago that the dust of the jasper, which is half as hard as diamonds, would polish the famous petrified wood of Arizona, and make of it table-tops and ornaments more beautiful than agate or onyx. The petrified wood is now brought from Arizona to Sioux Falls by the carload, and cut and polished in a variety of forms. To her jasper industry the city has added the manufacture of chalcedony. If these enterprising people do not find all of the precious things mentioned in the Book of Revelations it will not be for the want of searching. There is a scientific mystery about this so-called jasper. Practically it is all right. Its utility has been established, but geologically there is no little uncertainty about it. Those who know the most are the least positive, in discussing its character. Some of the scientific men who have looked at it call it a red quartzite. Professor Winchell says it is the hardest stone in the United States that has been used for building purposes. The grain is very close. The only element to which it succumbs is fire. It will stand a good degree, but crumbles like limestone and sandstone under too intense heat. In the last day, when all the elements melt with fervent heat, the Sioux Falls jasper will have to go. — *Globe-Democrat.*

Is the Earth in Danger from the Drill? — Prof. Joseph F. Jones answers, in a recent issue of the *Popular Science Monthly*, the question, "Is it safe to drill the earth too much?" The professor assumes the earth to be a hollow sphere filled with a gaseous substance, called by us natural gas, and he thinks that tapping these reservoirs will cause disastrous explosions, resulting from the lighted gas coming in contact with that which is escaping. He compares the earth to a balloon floated and kept distended by the gas in the interior, which, if exhausted, will cause the crust to collapse, affect the motion of the earth in its orbit, cause it to lose its place among the heavenly bodies and fall in pieces. Another writer thinks that drilling should be prohibited by stringent laws. He, too, thinks there is a possibility of an explosion, though from another cause. Should such a disaster occur, "the country along the gas-belt from Toledo through Ohio, Indiana, and Kentucky will be ripped up to the depth of 1,200 feet or 1,500 feet and flopped over like a pancake, leaving a chasm through which the waters of Lake Erie will come down, filling the Ohio and Mississippi valleys, and blotting them out forever." Still another theorist has investigated the gas-wells with telephones and delicate thermometers, and he announces startling discoveries. He distinguished sounds like the boiling of rocks, and estimated that a mile and one-half or so beneath the Ohio and Indiana gas-field the temperature of the earth is 3,500°. The scientist says an immense cavity exists, and that here the gas is stored, that a mile below the bottom of the cavity is a mass of roaring, seething flame, which is gradually eating into the rock floor of the cavern and thinning it. Eventually the flames will reach the gas, and a terrific explosion will ensue. — *Scientific American.*

The Adit at Schemnitz. — An engineering work that has taken over a century to construct is one of the most notable landmarks in history, if, indeed, it be not without precedent. An instance of this kind is to be found in a tunnel not long since completed, but which was commenced more than one hundred years ago. This tunnel, or adit, is at Schemnitz, in Hungary, its construction being agreed upon in 1782, with the object of carrying off the water from the Schemnitz mines to the lowest part of the Gran valley. The work, which is now complete, forms the longest tunnel in the world, being some ten and one-fourth miles long, or about one mile longer than St. Gothard, and two and one-half miles longer than Mount Cenis. The height is nine feet, ten inches, and the breadth five feet, three inches. This tunnel, which has taken so long a period to bring to completion, has involved an expenditure of about five million dollars, but the saving to those interested, in being able to dispense with water-raising appliances, amounts to a large sum annually. A fact of no little interest in carrying out this project is that, though the latter generation had greatly the advantage in the matter of machinery for accomplishing such a work, the cost of labor was greatly in the former's favor. The original contract was for the completion of the tunnel in thirty years, at a cost of $35 per yard run, and for eleven years the construction was carried on at that price. Public events, however, interfered with the progress of the work, as well as enhanced the cost of labor and materials, the cost per yard eventually exceeding one hundred dollars. — *Providence Journal.*

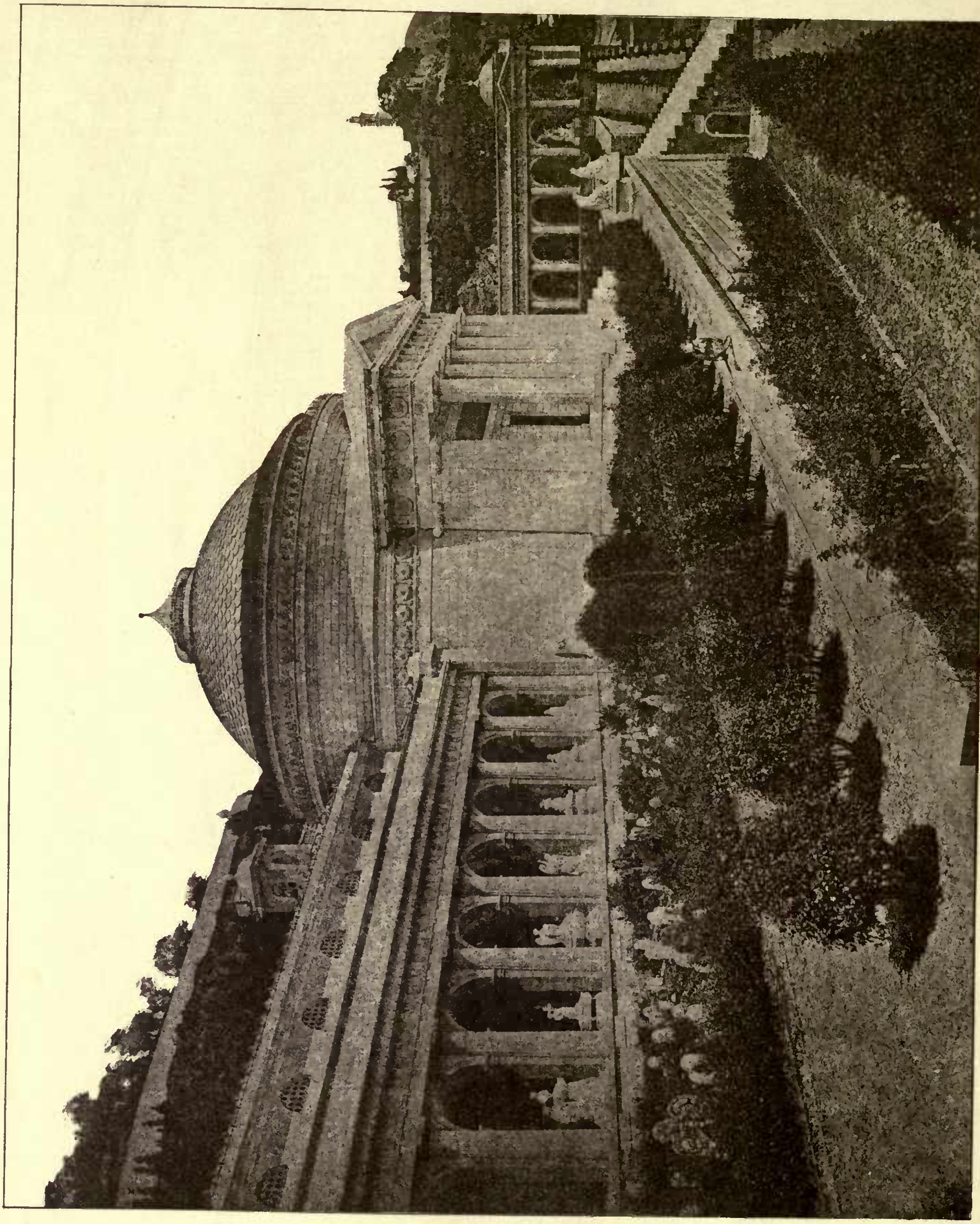
Work on the Forth Bridge. — The completion of the Queensferry cantilever of the Forth Bridge was accomplished last week and was made the occasion of a visit from the Directors of the Forth Bridge Railway, accompanied by the Duchess of Roxburghe, Lady Tweeddale, Lady Wemyss, Lord Colville, Lord Hindlip, and others. Both sides are complete, and now only the bridging over of the large gap between the two sections remains to be done. The gap is still 350 feet in width, and in the course of the next three months a large hog-backed girder of that length and fifty feet in depth will connect them. The girder, which is the largest ever used in this country, will weigh 800 tons. Now that it is approaching completion, the bridge, as regards working operations, is becoming inconveniently popular, for hundreds of excursionists come from all parts of the country to inspect it. Three of the most distinguished German engineering professors, under Professor Müller of the Berlin Engineering School of the Berlin University, with fifty students, were conducted over the works by Sir John Fowler recently, the visit having been officially arranged by the German Ambassador. — *London World.*

Building from the Roof Down. — A visitor to Japan tells of the peculiar methods of construction employed in that country: "Speaking of house-building, the Japanese begin their work at the top. The roof goes on first, and then they begin to build the walls and to construct the interior. One of the greatest curiosities to me in Tokio is a new hotel which is being built. It is to be on the foreign style and is to have four stories. It will be the greatest hotel in Japan. It covers about an acre of ground. As yet not a stone of the foundation has been laid, but the roof is already up and this stands on a great four-story skeleton of scaffolding awaiting the building of the rest of the structure. This scaffolding is made of long poles from the size and thickness of a campaign flag-staff down to the size of a bamboo fishing-rod, and the whole is tied together with ropes. Imagine an acre of scaffolding of this nature upholding a heavy roof, and the whole made up of sticks and ordinary rope. There are, I was told at the office, 7,000 poles in the skeleton, and 2,000 men had been at work for months in making it." — *New York Mechanical News.*

TRADE SURVEYS

The general markets of the country have been bare of any significant features for the past six days. Trade, financial and commercial journals contain nothing but the usual stock-in-trade, and even the authorities in the commercial world, whose utterances are regarded with confidence, are either reticent or are repeating in a new shape old opinions. While there is nothing that is new to say, there are several features of the market that have not yet been properly observed and interpreted. The few failures that have taken place have had a much wider influence than is apparent upon the surface. Whether the influence is right or not, it has been exerted in the direction of a general drawing-in of loans and a closer settlement of accounts, etc. The failures referred to acted as a danger-signal, which thousands of men in businesses, big and little, have taken note of. In this respect the failures have been of advantage. They have brought about a closer inspection of actual conditions on the surface and below it. They have made men careful who had not been so, and have made money-lenders cautious who have heretofore felt no need for caution. The possibility of a general weakening in confidence has alarmed a great many, and the care that has already been taken to avert such a catastrophe has been productive of good results. Referring again to the subject of extraordinary building activity, it is to be noted that a large amount of work has been done on borrowed capital — much larger than has been supposed. Large blocks of money have been expended and loaned by trust concerns because of the supervision and control which could easily be exercised by the investors. Some prominent real estate authorities and conveyancers of wide experience have within a week or two past been furnishing some inside statistics and estimates, which, if studied by the building interests, might lead to a little more conservatism. The misfortunes to enterprise of this kind, should they come, will not fall upon the lenders of money, but upon the instalment-plan buyers of small houses and upon contractors and builders who have not yet been fully paid for their services. The same rush is kept up in all of the larger cities; in fact, since July 1, the activity in building has been greater than during the earlier months. With all, lumber, instead of advancing, has declined a little, excepting in Pennsylvania hemlock. The rush of Southern forest products into Northern markets has been partly responsible for this unexpected weakness. The iron trade has not weakened in the least, and in Western markets there are many evidences of growing strength. All of the observations heretofore made concerning the iron trade hold good with increased force. It will probably be strengthened by large contracts placed by railway interests. Commercial *résumés* concerning textile interests would have us believe that business is in a flabby condition, but an honest review of those interests justifies a condemnation of such opinions. The simple fact is that more textile products are being turned out and distributed in this country than ever, excepting at isolated periods. The general demand is increasing; the strong condition of the wool markets is evidence of it; the strength of the cotton market is another proof. The boot and shoe output, adding the product of some widely scattered factories to the New England production, is in excess of last year. New schemes are rapidly coming to the front. Thus far, there has been no difficulty in obtaining capital, and chiefly because the West and South are being supplied with little financial centres of their own. The extension of national banks to these sections has done much to liberate the far West and South from dependence upon the East. The effect of railway expansion is also felt, and the development of new industries and new mines has added sources of strength whose effects are far-reaching. No matter in what field an observation is taken, there are elements of strength discovered which are likely to survive any temporary depression, should one occur. New York commission and jobbing houses feel that they have been fully justified in making more ample preparation for the distribution of fall and winter goods than last year. There is a very strong undertone in that commercial centre. The factories and mills have not yet felt the full effect of it. Reports from Philadelphia show a strong feeling in manufacturing and commercial circles. Recent railroad reports indicate a further improvement in earnings. In the Ohio Valley, all of the industries seem to be in a very prosperous condition. The vitalizing influences that have been at work for a year or two in the Northern Mississippi Valley region are exerting themselves in all of the territory contributory to Chicago. Throughout Kentucky and Tennessee there is great activity at all the little industrial centres, and the railway managers deserve credit for the painstaking efforts they are making to assist in the further development of the resources of the South. New Orleans is gaining ground every month as a commercial and a manufacturing centre. The possibility of obtaining a cheap supply of Alabama coal is drawing the attention of a good many capitalists to that city.

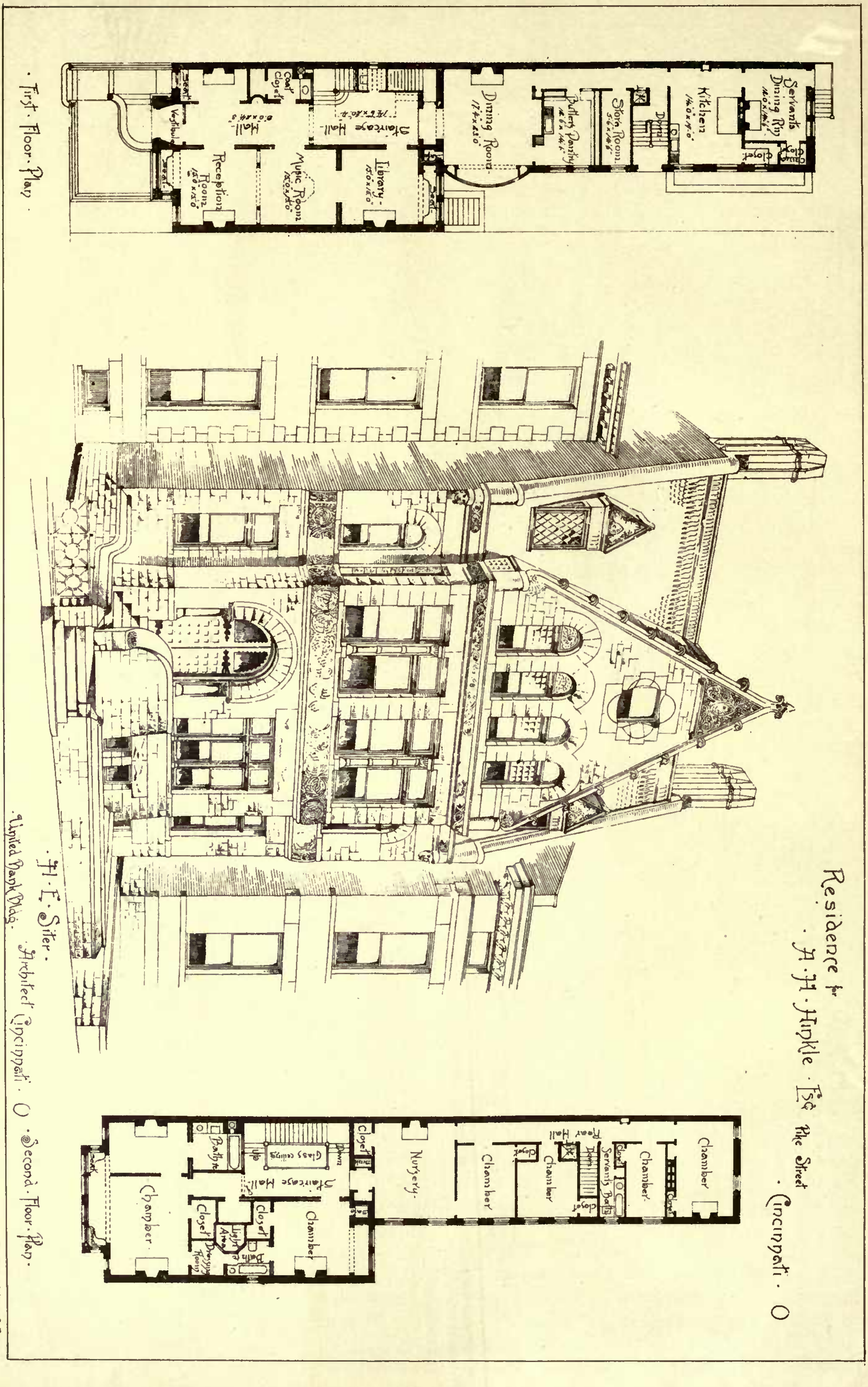
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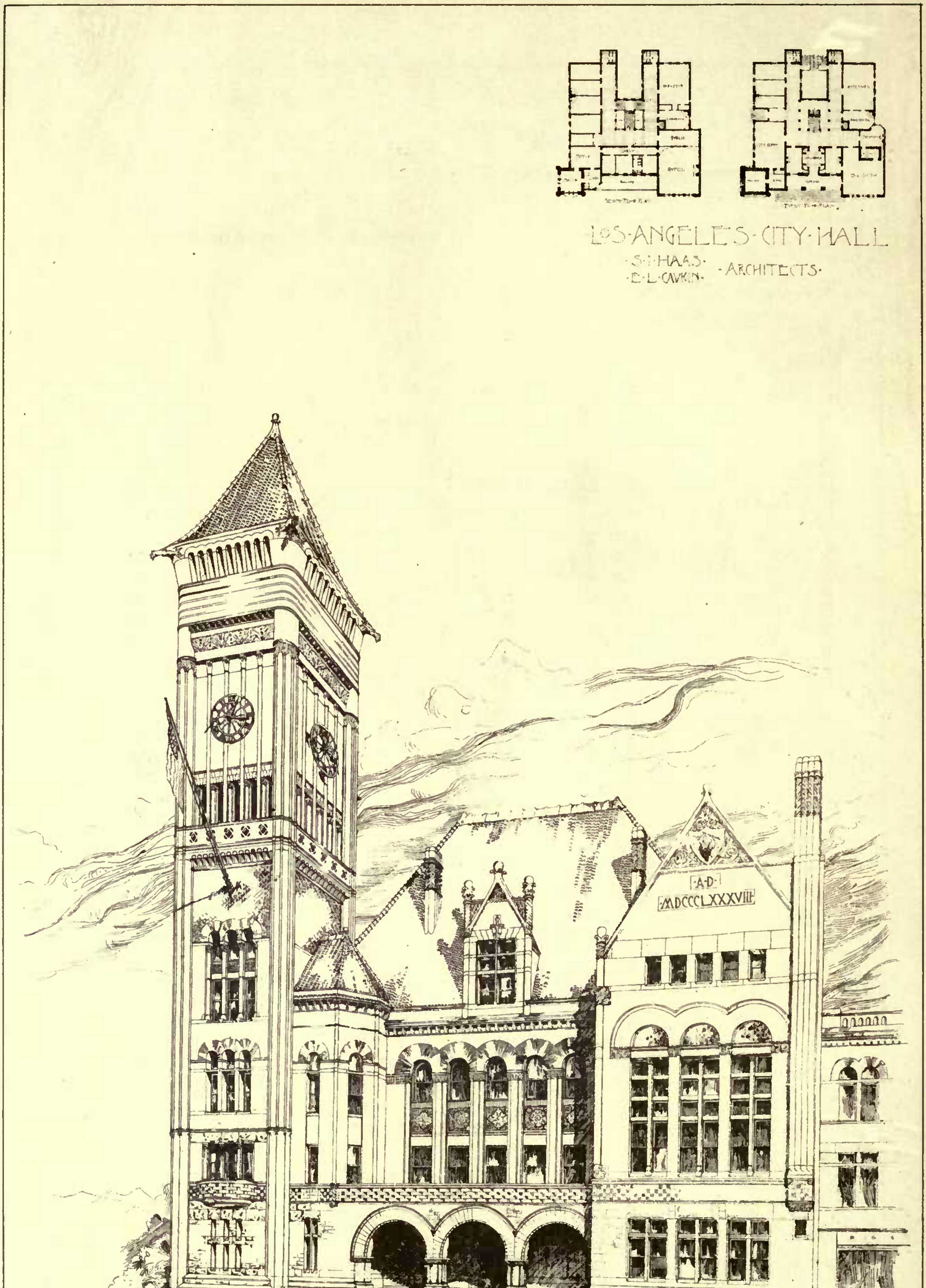
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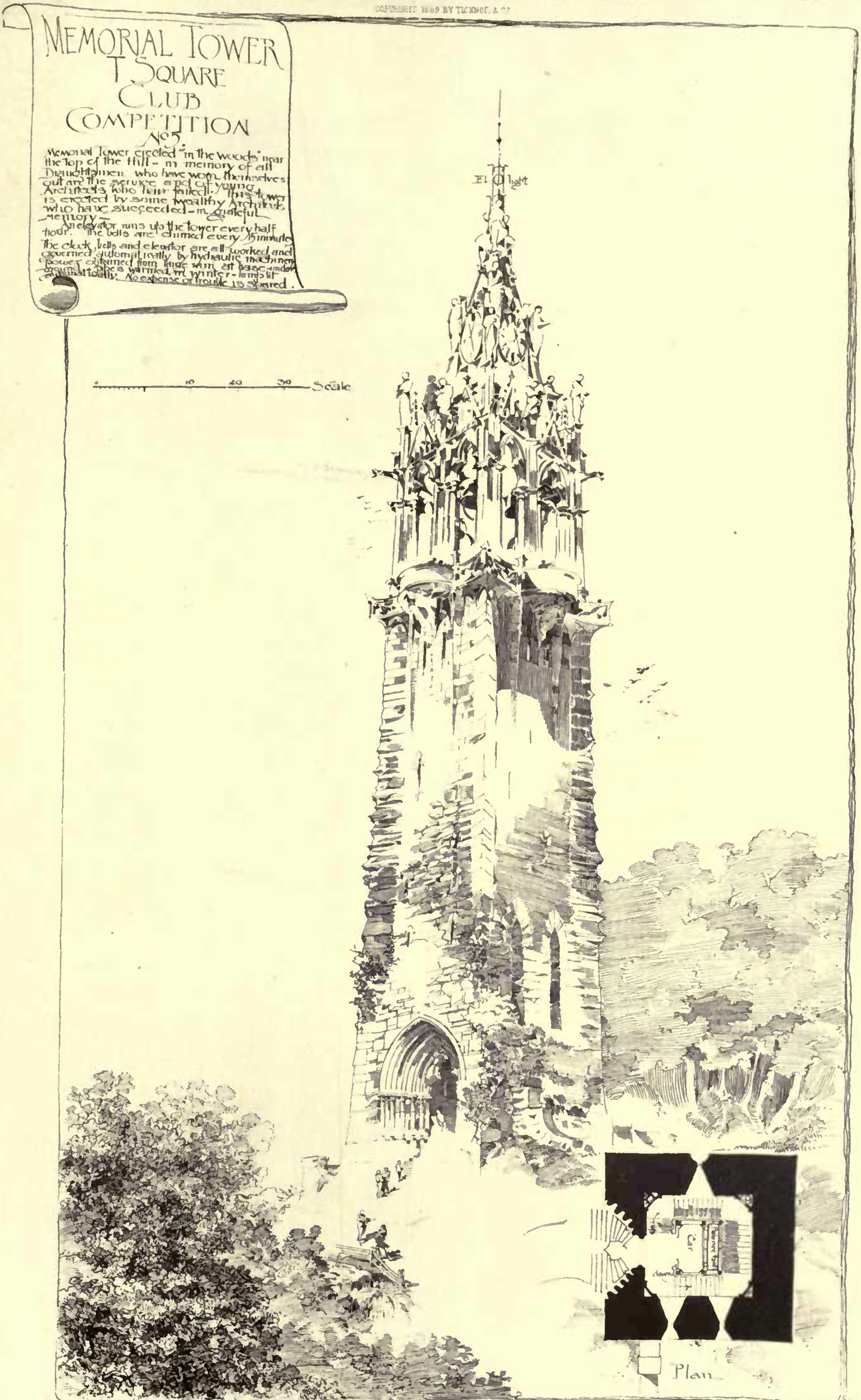
Building of the New York Life Insurance Co.
Montreal, Canada.
Babb, Cook & Willard, Architects.



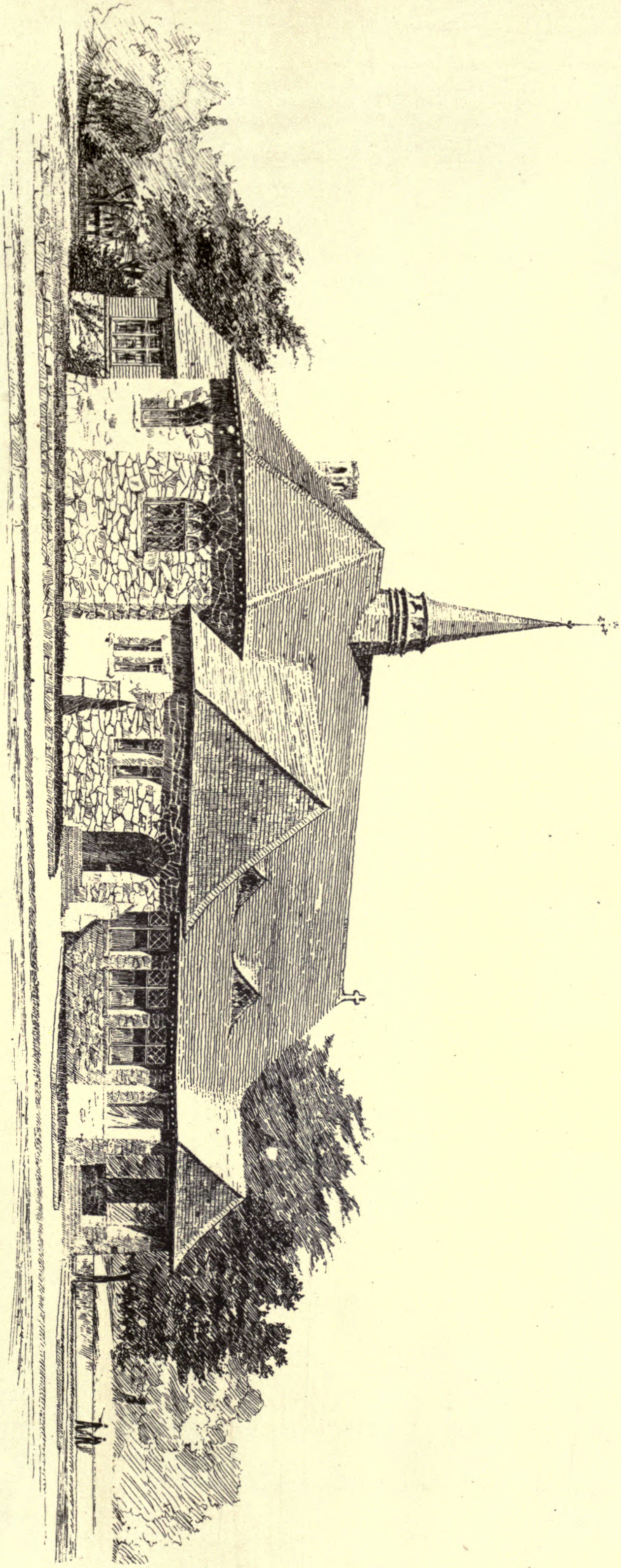
Residence for A. H. Hinkle Esq Pike Street Cincinnati O
H. E. Siter Architect United Bank Bldg. Cincinnati O
First Floor Plan
Vestibule
Hall
Coat closet
Staircase Hall
Reception Room
Music Room
Library
Dining Room
Butler's Pantry
Store Room
Kitchen
Servants Dining Rm
Closet
Second Floor Plan
Chamber
Closet
Bath
Light Area
Dressing Room
Staircase Hall
Glass ceiling
Up
Down
Nursery
Servant's Bath
Rear Hall
Heliotype Printing Co. Boston



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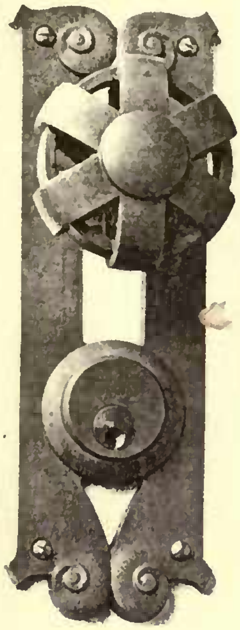
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· FIRST SKETCH FOR ST· JOHN'S CHURCH · AND SUNDAY SCHOOL AT FALL RIVER ·

· WHEELWRIGHT · AND · HAVEN · ARCHT'S.

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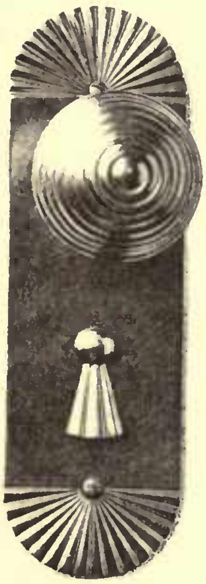
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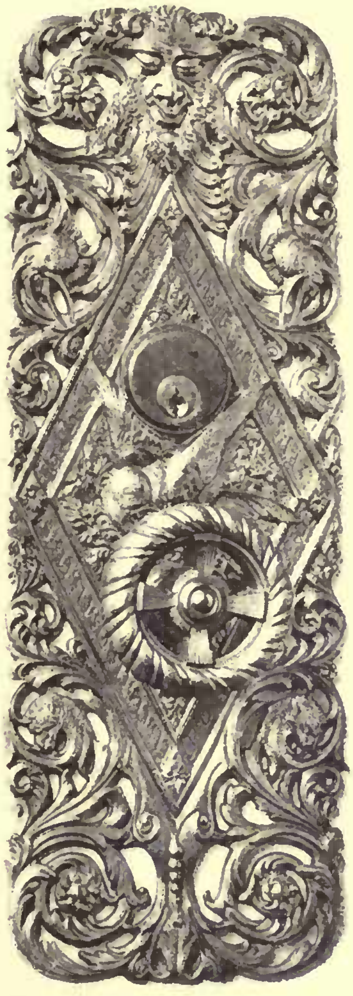
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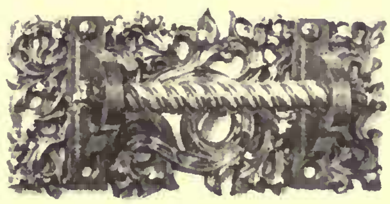
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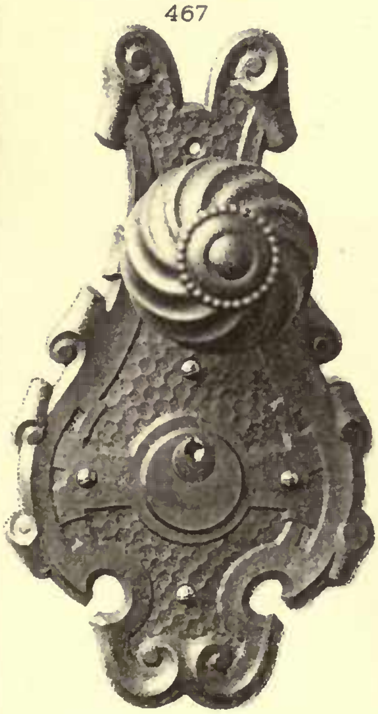
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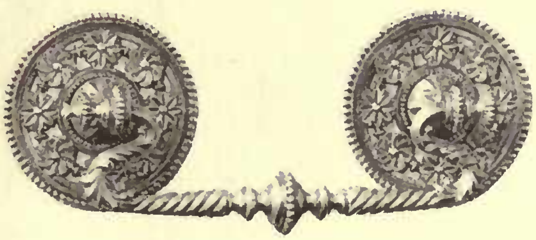
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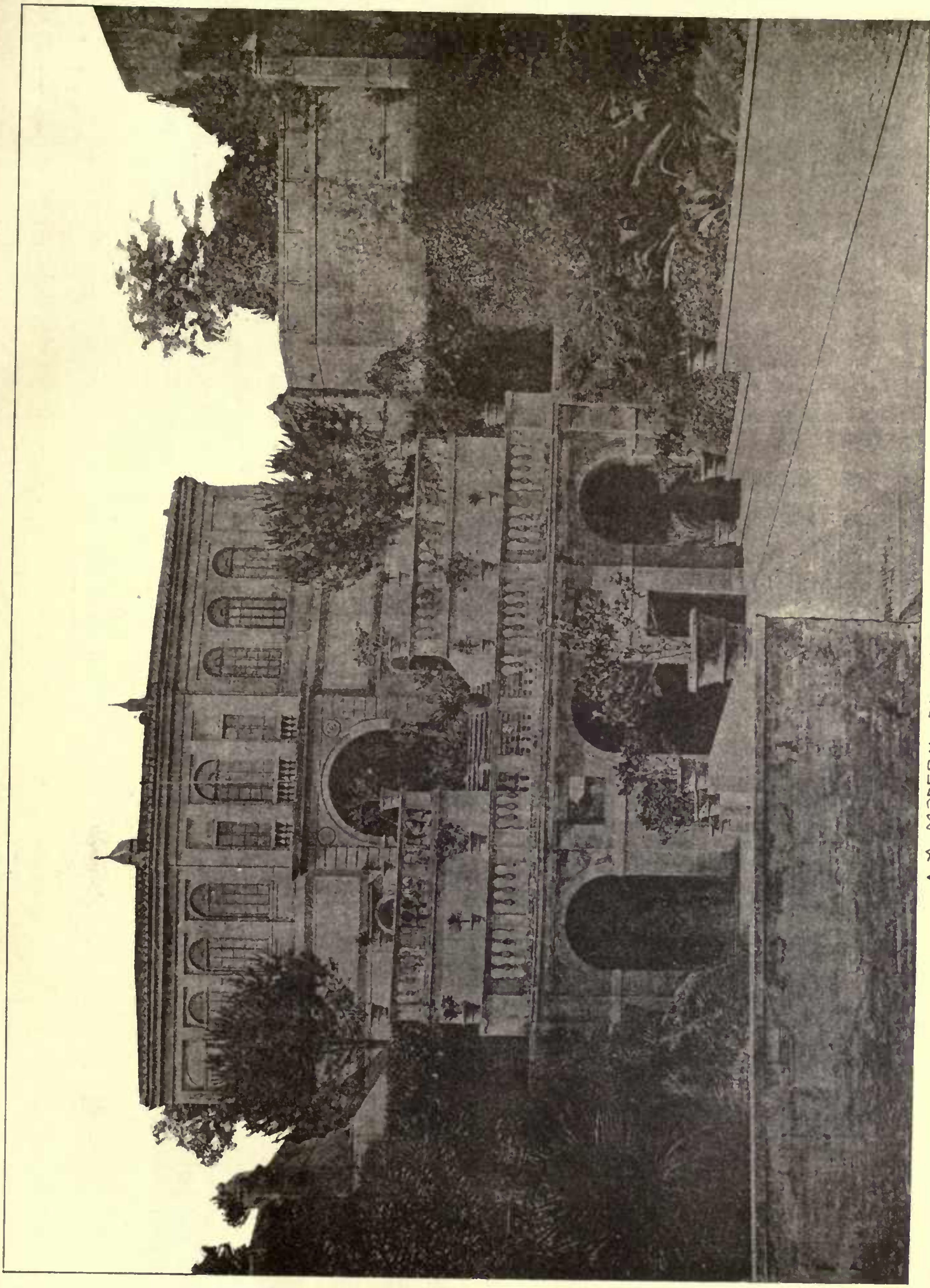
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· ARTISTIC HARDWARE · · ·

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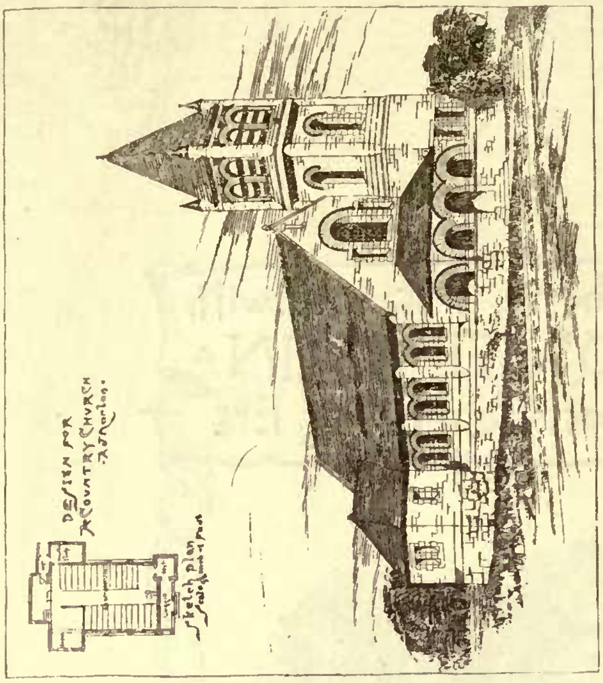
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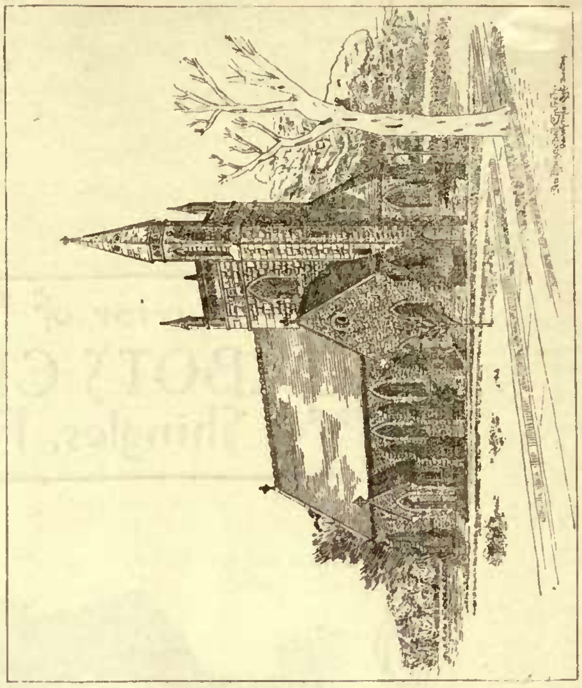


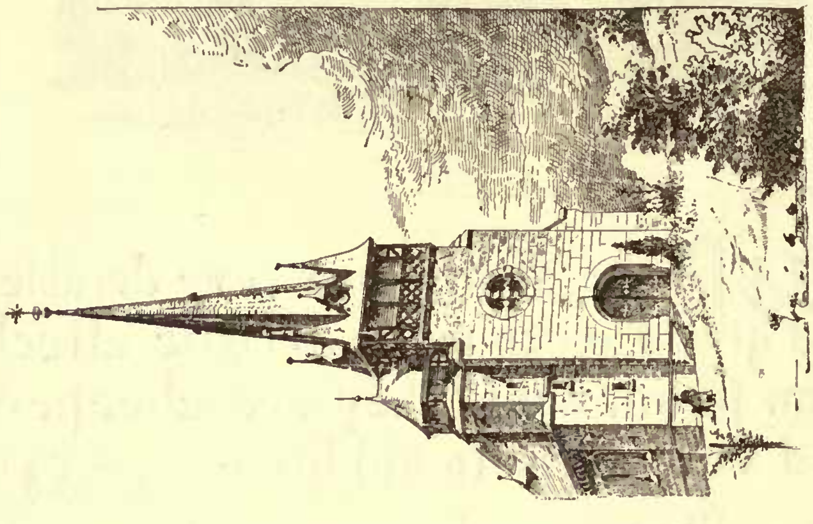
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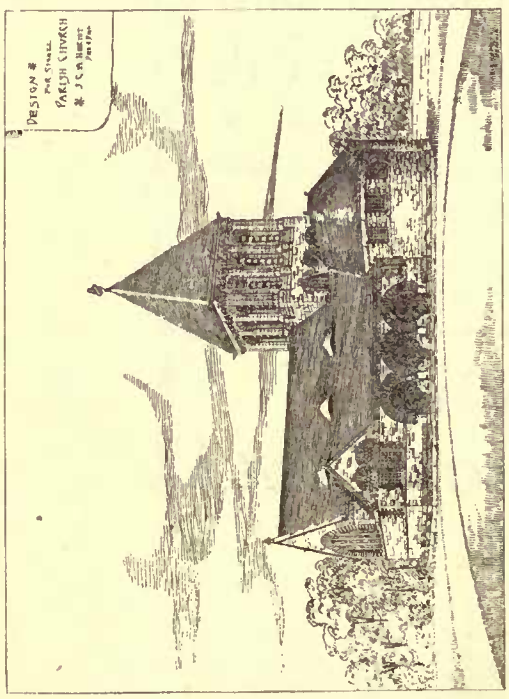
MASONIC BUILDING, PITTSBURGH, PA.

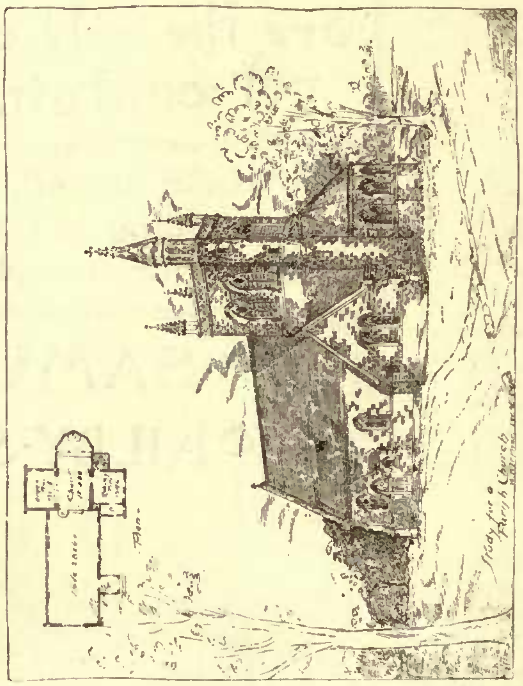
SHEPLEY, RUTAN & COOLIDGE, Architects.


DESIGN FOR A COUNTRY CHURCH
Sketch plan






DESIGN FOR SMALL PARISH CHURCH


Plan
Study for a Parish Church

CHAPELS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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AUGUST 17, 1889.

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A DECISION of very considerable importance to persons interested in building has just been delivered by Judge Colt, of the United States Circuit Court, in Boston. It appears that a part of the construction of the new court-house, now in process of erection in that city, consisted in a frame, composed of wrought-iron beams, angles and so on, put together in the manner usual in such cases, and destined to support a floor. The contractor for the ironwork found it cheaper to buy his iron in Belgium than at home, and the frame in question was fitted, drilled and shaped there from the drawings, and the pieces then shipped to Boston to be put together in place. The custom-house officials levied a duty on the whole of one and one-quarter cents per pound, under the tariff of 1883, which places that impost upon "iron or steel beams, girders, joists, angles, channels, car-truck channels, T-columns and posts, or parts or sections of columns and posts, deck and bulb beams and building forms, together with all other structural shapes of iron or steel." The importer of the ironwork, of course, paid the sum demanded, to prevent the confiscation of his property, and then availed himself of his privilege of bringing suit to compel the collector to refund about two-thirds of the duty paid, on the ground that the frame was subject, not to the provision of the tariff relating to beams, but to the provision of the same tariff which says that "Manufactures, articles or wares not specially enumerated or provided for in this act, composed wholly or in part of iron . . . and whether partly or wholly manufactured," shall pay "forty-five per cent *ad valorem*." The judge decided from the evidence that what was imported in this instance was not the separate beams, girders and angles, nor a "structural form" in the commercial sense, but a new article of manufacture, subject only to the *ad valorem* duty of forty-five per cent, and that the fact of the frame being composed of beams and other articles specifically enumerated as subject to the duty of one and one-quarter cents per pound did not change the classification under which the structure as a whole should be placed, even supposing it to be possible, which was not proved, to sell the portions of the structure separately as merchantable beams.

THIS decision will probably surprise a good many people, particularly among architects and builders, who, perhaps from the fact that iron in buildings is usually paid for by the pound, whatever the shape in which it may be employed, have formed a habit of associating all forms of structural wrought-iron together in their minds, and return with some difficulty to the legislative view, which makes a sort of distinction between the beams, channels, angles and other ordinary materials of construction or manufacture, and the structures into which these materials are combined or "composed"; but it is unlikely that Judge Colt's decision will be reversed, or even seriously questioned, and, unless it is reversed, the result appears to be that persons, at least in the seaboard cities, who wish to use iron or steel domes, roof or bridge trusses, or similar combinations of the ordinary structural shapes, made in accordance with designs, and fitted and drilled or punched before delivery, can get them much cheaper from Belgium or France or England than at home.

THE Brooklyn *Times*, in an editorial about the competition for the new Criminal Court building in New York, presents some judicious, if not very forcible, thoughts on the folly of asking the competing architects to state the price of their services, and selecting the man who valued them at the lowest rate. The *Times* thinks that the usual five-per-cent commission is small enough for the care, skill and work required, and hopes that the practice of setting architects to underbid each other will not become general, for the sake of the public as well as the profession. This is, of course, very well, but the case is not strongly enough stated. We do not for a moment intend to cast any reflection upon the gentlemen whose proposition has been accepted, and who, we are sure, deplore now, and will deplore still more later, the necessity which seemed to compel them to offer to do the work at an inadequate price, or lose it, and the reputation which they hoped to gain by it, altogether; and we know that they will confirm our assertion, that if architects are to be generally expected to bid against each other for work, the commissions will all go to the most ignorant and dishonest men in the profession, and, more singular still, these ignorant and dishonest persons will make more money in carrying out their clumsy, ignorant and extravagant plans than the best architects would in executing the most beautiful, convenient and skilfully-studied designs at the usual remuneration of five per cent. By what arts this remarkable result is brought about we will not explain. While we do not regard the individuals who supplement a two-per-cent commission from their client with one of twenty per cent from the contractors as having any claim to be numbered among architects, we know that the public, after it has had a few wolves in sheep's clothing pointed out to it, immediately concludes that all sheep are wolves in disguise, and the faithful shepherd finds it best to prod the wild beasts in his fold on his own account, without calling the attention of the bystanders to them. At the same time, it is not amiss to suggest that the architect who carries out any building is virtually a trustee, with particularly good opportunities for wasting, appropriating and misapplying his employer's money. To award the execution of an important work to the architect who will do it for the least pay is exactly as sensible as it would be to award the presidency of a bank or the trusteeship of an estate to the lowest bidder. The lowest bidder in these cases would obviously be the one most likely to squander and abuse the funds committed to his charge, if he did nothing worse with them; yet the opportunities for malfeasance of a bank president or trustee are very limited in comparison with those of an architect. Under the ordinary contract, the architect can easily make his employer pay twice as much for his building as it is worth, and can put the difference in his own pocket, not only with very little fear of detection, but with still less apprehension of punishment if he should be found out. That such a thing rarely happens in any case, and never occurs with reputable architects, is simply the result of the conscientious view of professional obligations which is universally taken among them, but for which the public gives them much less credit than they deserve. A man who goes to a physician of reputation can do so in full confidence that the doctor will not drug and rob him, or keep him low with poisons, so as to gain an income by attending him, and he pays cheerfully the regular fee; or, if he chooses to consult a cheap quack, he knows that he does so at his peril, and his cheap advice is usually by far the dearest in the end. So with architects: the men who feel the sacredness of the trust reposed in them, and who will neither betray it themselves nor endure the companionship of those who are known to be capable of such

treason, have agreed, all over the world, upon a scale of minimum charges, for less than which they cannot properly carry out their commissions and save enough to give themselves and their families a modest living. If the five-per-cent charge did more than this, it would, in the keen competition between honest architects, have been modified long ago; but the tendency of late years, notwithstanding the increased competition, has been toward raising, instead of lowering, the standard, and whoever employs an architect who is satisfied with less than the regular rates may be tolerably sure that he is either not getting thorough and skilful service, or that the architect has a bad bargain, which he will be strongly tempted to make more favorable for himself in some surreptitious way.

IT is hard to maintain one's equanimity in reading such items of news as one telegraphed from Chicago a few days ago, to the effect that an epidemic of typhoid fever had broken out in Chicago, which most people with common sense attributed to the washing of filth from the sewers, by the recent heavy storms, far enough out into the lake to be taken up again at the "crib," and pumped back for the citizens to drink, but which "the mayor and other officials" found must be due to some other cause, as they had "examined the water at the crib," and had found it "safe to drink." Concerning the sanitary propriety of a system of drainage and water-supply which consists in emptying the whole sewage of the town into the place from which the city water-supply is pumped up, there might possibly be an honest difference of opinion, but the attempt to silence the complaints of the terrified citizens by saying that "the mayor had examined the water," and found it "fit to drink," strikes us as being the worst piece of official impudence we ever heard of. It is needless to say that the most expert microscopist the world ever saw, joined with the most eminent chemist, would not be able, in a year's testing by the most delicate methods, to say whether the water at the crib contained the germs of typhoid fever or not, and the "examination" of the water by "the mayor and other officials" was simply the broadest farce. That a person who was in the habit of drinking the lake water should be taken with typhoid fever is evidence to show that the water contained fever germs which would outweigh the negative assertions of all the mayors in Christendom, and as more than a hundred and fifty cases have occurred in a single street, the inference can scarcely be avoided that the infection comes from the lake water. As each case of fever forms a new centre, from which millions of fresh germs are thrown out, to find their way, probably, in most cases to the sewers, and thence again to the lake, the prospect seems to be that the city water-supply will soon be frightfully infected. Already, the physicians are advising their friends to boil all water before drinking it, but experience has shown that it is very difficult to have this precaution thoroughly applied, and radical measures may be necessary to save Chicago from a terrible visitation.

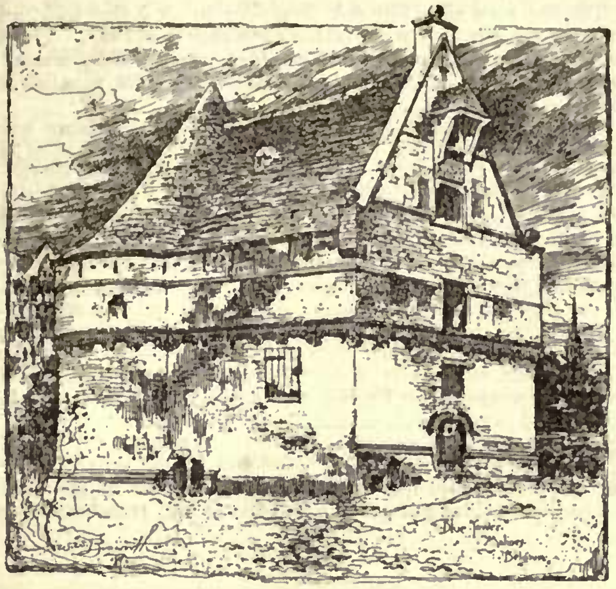
THE highest construction of masonry in the world, and, next to the Eiffel tower, which is likely to be for a long time unsurpassed, the highest structure of any kind, has just been completed in Turin, after a rather curious series of events. Our older readers may remember that we published, many years ago, detailed drawings of the new Synagogue of Turin, which was then in process of erection, and bade fair to be one of the ugliest as well as tallest of modern buildings. The Synagogue was commenced in 1863, from the designs of an architect of reputation, the Cavaliere Antonelli, who had already built a church in a neighboring town, with a very lofty dome. The extension of the same *motif* to the design of a synagogue on a large scale proved unfortunate. It was not long before it became evident that the building would not be well adapted to the needs of the congregation which were to occupy it, while its cost would far exceed the sum which could be devoted to its erection. Before the dome was far advanced, therefore, operations ceased, and the unfinished temple was abandoned to any one who could find means to complete it. After some years, the municipality of Turin, wishing to found some monument to the memory of Victor Emmanuel, decided to purchase the unfinished synagogue, and remodel it into a national museum. Antonelli was called in again, and remodelled his plans to adapt them to the new requirements, putting on top of his dome, which originally formed a sort of overgrown mansard roof, a spire or flèche, nearly as high as the whole of the rest of the building. Æsthetically, the effect as modified was, perhaps, no worse than it was before, and practically, as the remodelled structure would be higher than any other building in the world, there was something about the scheme to arouse the enthusiasm, and open the pockets, of the citizens, which the old plan would have lacked. Still, the affair went on slowly, and when the gilt statue was placed on the apex of the spire, five hundred and thirty-eight feet from the ground, M. Eiffel had already far surpassed it. The dome, which is quadrangular in plan, is composed of brick, in two concentric shells, with internal and connecting ribs. The interior is open from the third floor to the inner shell of the dome, giving an effect somewhat resembling that in the Palais de Justice at Brussels, although the Turin dome is much more spacious than the other. So far, the people of the city seem to have been unable to call the building by any name more appropriate than that of the architect, and as the "Mole Antonelliana," or Antonelli's Pile, it will probably be known for centuries to come.

A CHURCH of the fourth century is said to have been discovered near the city of Sophia. In digging for some purpose in the suburbs of the city, some stone walls were found, about two feet beneath the surface, which proved to enclose a room, about forty feet long, and thirteen feet wide, with an eastern apse, and two small chambers, one on either side of the main entrance. The whole affair was completely filled with earth. The masonry was in good preservation, though evidently very ancient, and the walls seem to be the remains of the church, *extra muros*, in which ecclesiastical history relates that the Council of Sophia, or of Sardica, as it was then called, was held in the year 343.

UNTIL now, the commercial manufacture of luminous paint has been confined to England, where a single factory turns out a small supply at a price of about three dollars a pound. This enormous cost seems to have prevented the use of the paint except as a curiosity, and it is fortunate that a certain firm named Mähren, at Triesch, in Austria, has found means to produce it, and place it on the market at fifty cents a pound, or about one-sixth of the English price. Even at fifty cents a pound, a substance composed of roasted oyster-shells and sulphur might, we should suppose, be manufactured at a good profit, but at that price it is likely to come into extensive use. Wherever it can absorb light during the day, it will give it forth at night, and it is said that a railway car in England, which had had its ceiling painted with it, was so brilliantly illuminated that one could see to read a newspaper in it during the darkest night, without other light. With all due allowance for the enthusiasm of early experimenters there is no doubt that cars with ceilings so painted would be pleasant to ride in, whether one could really see to read in them at night or not; and for making key-holes, stairways and sign-boards luminous, the paint would be invaluable. Its application to stairways is a particularly obvious one, and the Austrian manufacturers furnish a kind of wall-paper, on which the paint can be used to better advantage than on the bare plastering. The paper, which is of a leathery texture, is first treated with lime-water, and then primed with a composition furnished by the same firm. After this is dry, two thin coats of the luminous paint are applied, and the whole may then be varnished.

ANOTHER extraordinary railway has just been put in operation near Lake Lucerne. About twelve hundred feet above the lake, on the Bürgenstock, is a hotel, which is now connected with the steamboat-landing on the shore by means of a cable-railroad which uses electricity as a propelling force. The track is laid at an angle with the horizon which reaches thirty-eight degrees in some places, and the cars, in trains of two, are dragged up this slope, and around the surprising curves which diversify the line, by means of a series of endless ropes, driven by a huge wheel at the top, which is itself driven by an electric motor supplied by a current from three dynamos placed near the shore of the lake, and actuated by turbine wheels. The turbines derive their force from the stream known as the Engelberger Aa, which here falls into the lake, and the current from the dynamos serves not only to operate the railway, but to light the hotel and the neighboring roads, and to drive the pumping-machinery by which the settlement is supplied with water.

BUILDERS' HARDWARE.[1] — XXXI.



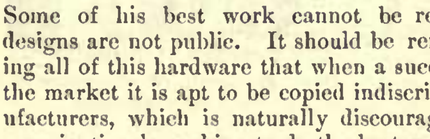
S. A. G. NEWMAN. Figure 475 is a fine example of a door-handle, having every appearance of being made from a pattern which was modelled instead of being chiselled or carved in wood. The leaf at top and bottom of the plate grows naturally from the single roll at the sides, and the handle is made to look just what it is — a door-pull — without being tortured into any unique or startling form. It is a thoroughly well-designed piece of hardware and as artistic as anything that is found in the market. Figure 476 is less pleasing in the result, though the motive is a good one. The top of the escutcheon is borrowed from an architectural form which needs relief and some fine mouldings, both of which could be added to advantage in this design. It is executed in silver plate, slightly oxidized and buffed to a clear surface on the high lights. Figure 477 illustrates a knob which serves admirably for a parlor or a music-room carried out with colonial fittings, — a Chippendale knob in fact, if the expression may be allowed, and very handsome by reason of the irregular reflections and high lights on the curved flutings. Figure 478 is a quieter design, but very satisfactory except for a little heaviness in the flutings. Figure 479 is a very careful and judicious design, the knob being one of the very few in which a broad, milled-edge forms a marked feature. It is a natural device and is worked in very prettily, the dainty ornament at the top of the knob being equally appropriate for its place. Figures 480 and 481 are other forms, both finished in dark antique bronze. Figure 482 is an escutcheon-plate for a sliding-door, and matches the plate of Figure 476. Figure 483 is a simple but very effective door-pull, in light bronze.

Newman has the reputation of doing a great deal of fine order work for the New York architects from special designs. Some of his best work cannot be reproduced here as the designs are not public. It should be remembered in considering all of this hardware that when a successful design is put on the market it is apt to be copied indiscriminately by rival manufacturers, which is naturally discouraging to those who are conscientiously seeking to do the best work. The rule, almost, is, that the better manufacturers make their designs, and the cheap men steal them.

[To be continued.]

OLD COLONIAL WORK OF VIRGINIA AND MARYLAND.[2] — III.

CARTER'S GROVE.



AT the end of a wearisome drive of about seven miles southeastward from Williamsburg, over a road which stretches through a flat and dreary succession of corn-fields, peanut patches and pine woods, the traveller, now nearing the north bank of the James River, will see afar off across the level fields an imposing cluster of buildings standing in a copse of tall, spiring trees. Leaving the road and winding tortuously across the plantation, he drives beneath the arching boughs of a short avenue of old locusts, and, emerging upon a circular lawn of somewhat unkempt appearance, sees before him the stately pile of Carter Burwell's ancient manor-house of Carter's Grove. There is a fine air of mossy age on this, the north side of the great house, but one's first glance at the façade reveals the disappointing fact that a very modern and wholly incongruous veranda covers a third of the first story — a feature sadly out of style and æsthetically deplorable; comfortable, no doubt, but ugly. The exterior is simple, square, massive; the openings, symmetrically distributed, have a rather high and narrow look. The house stands well up out of the ground, and above the cellar there are two stories crowned by a high, unbroken slate roof sloped from the ends of the house, so that the hips meet in the ridge about one-third of the distance from either end of the house. Two square chimney-stacks come out of the roof near the apex of the pitched slant, and rear their bulky shafts high above the ridge-pole, ending in a simple, though very effective, topping-out. The lines of the roof are bold and pleasing; near the eaves they curve outward in a graceful sweep. The cornice is of wood, and shows a row of dentils with a few simple mouldings under the rather broad soffit of the eaves. The solid-looking walls are laid-up of small, dark, English brick in Flemish bond, and they have a rich, deep-red color. The brick, iron, carved and panelled woodwork, sashes, hardware, oak flooring, and, in fact, nearly all the materials, were imported from England.

The house was built in the year 1737.

The walls show an increased thickness on the outside below the level of the first floor, and at the height of the second floor there is a band, slightly projected, several courses in width, and finished with a moulded course at the top and bottom, running all around the house. Flat arches, with voussoirs one brick and a half high, cover the openings. Otherwise, the brickwork is perfectly plain.

The walls, both exterior and interior, are of massive thickness, running from three to four feet throughout. The roof is a wonderful assemblage of massive timbers, put together with that intelligent observance of the principles of good carpentry which characterized the work of the period.

The door and window frames and the sashes are very solidly built; the sash-bars are broad and strong, and filled with glass of moderate size. All exterior woodwork is painted white.

The out-buildings flanking the great house are low, one-story, brick houses with high-pitched slate roofs pierced on each side with three dormer windows. One of these houses is used entirely for kitchen and scullery; the other serves as an office and storehouse. The main house is in the form of an oblong square, whose outside dimensions are about fifty by eighty feet, I should say.

A great hall, twenty-eight feet in width, occupies the centre of the first floor, cutting the house in twain. Out of this grand manorial entry-way heavy panelled doors of generous width give upon the front and rear, looking toward the river and the road. A broad arch, spanning about twenty feet, bisects the hall. Starting under this arch, the grand stairway sweeps up in three easy runs to the floor above. With its low risers, broad treads and carved balusters of mahogany, it has a very sumptuous appearance. The floors of the landings are inlaid with a handsome parquetry of light and dark woods. There is a broader step at the foot, over the rounded end of which the rail swings out in a spiral whirl, and ends over a delicate, twisted newel. The twisted post is repeated at the turns and occurs upon the landing above. The rail is nicely worked into ramps of easy curve. The balusters are set three to the tread. A wainscot in long panels of mahogany covers the wall side, and has ramps following the curve of the stair-rail, and twisted half-posts set opposite those at the turns. The last panels in the wainscot, next the landings, are made to follow the up-curve of the rail. The tone of the mahogany is very dark and rich, and the effect of the whole stairway is quite splendid. The downward ramp in the rail as it turns across the stair-well on the upper landing is well worth noting. The scheme is useful, since it warns one of the approach to the head of the stairs, as well as being pretty in effect. Several ugly gashes in the rail on the first flight are said to have been made by the sabres of Tarleton's dragoons, who, while bivouacked here during the Revolutionary War, enjoyed the quiet diversion of riding their chargers upstairs and hacking away at the hand-rail as they rode.

From the landing on the second floor doors open on either hand into bedrooms. There one passes under a round arch, which pierces a partition carried on the great arch below, into a large ante-room or corridor lighted by two windows looking out upon the terraces and the river.

From this lobby doors open into the principal bedrooms. The woodwork about the smaller arch is similar in treatment to that of the larger span on the first floor. Looking through it toward the head of the stairs, one gets a very pleasing picture. The walls of the lower hall are wainscoted from floor to ceiling. Above the base is a plain board dado crowned with a narrow cornice, the upper member of which is quite ornate, the whole being about three feet high. From dado to frieze the wall is covered with a single large panel, raised and bevelled.

The frieze contains two bronze members swelled out into a curved projection, and separated by narrow horizontal mouldings. The cornice is made up of a number of members, among them a bracketed

[1] Continued from No. 711, page 60.
[2] Continued from No. 705, page 305.

dentil band surmounted by a strongly-projecting corona. Three large panels sheath the wall above the stairs, diminishing in height with the line of the ascent, and over these the cornice is returned. Near the top of the first flight the upper panelling stops abruptly, all above showing the bare, plastered wall.

On either side of the arch are broad, fluted pilasters projecting from the wall, standing on bases of the height of the dado, and crowned by shallow, composite capitals richly carved. Above these the entablature is brought out with proper projection and returned at the ends.

Triangular panels occupy the spandrels of the arch and the side of stairway. The stars in these panels and on the key of the arch are from the frieze of another room.. The jambs and soffits of all the doorways, and the soffit of the stairs, are handsomely panelled. The architraves are not especially noticeable.

An almost incredible misfortune has in recent degenerate times befallen the beautiful woodwork of this great hall: dado and panelled wainscot, swelling frieze and dentilled cornice, fluted pilaster and sculptured capital, panelled arch and noble enablature, all have been painted by some vandal hand — and I hasten to absolve the present proprietor, who is guiltless of the crime — in shrieking tones of red, white, blue, and — *mirabile dictu* — green! Absolute justice to the artist compels me to add that he has used his green rather sparingly, but what there is of it is most relentlessly green. And yet, under all this coarseness, while it is almost impossible to get the proper value of certain members to which the harsh coloring has given exaggerated weight, one can still see the dignity of the whole scheme of decoration.

The two floors are very similar in plan, there being two large rooms, almost square, on either side of the great hall, which occupies the middle third of the whole floor-space.

The two chimneys carried up on the middle transverse partitions give a fireplace of generous size to each room. Those in the library and dining-room are of very liberal dimensions. There is, in the parlor, a mantel in Sienna marble of very good design in the refined style of the period. The wainscot of the room, which is called the library for lack of other distinguishing name, is in large panels of pine, from which the paint has been scraped off. The color is very rich and dark, and the room altogether very handsome. I should estimate the height of the first-story rooms at about twelve feet, or perhaps fourteen, and, with their tall panellings, they are impressive. The window-frames are set well out, thus leaving a deep reveal in the thickness of the wall inside, where cosy window-seats have been built in.

The floors are all of rift oak, from four to six inches wide, and as sound as the day they were laid, a carpenter would say. The doors are in light raised, bevelled and moulded panels, solidly framed and very thick. My impression is that there are solid panelled inside blinds to all windows.

In its chief feature, the grand entry-hall, this handsome colonial residence adheres to the model of the English manor-houses of the time, in which the great baronial hall of feudal days still survived.

It was here that the family received their guests, the ladies pouring tea for the beaux who came riding *en grande tenue* to pay their court in the long afternoons of the beautiful Virginia summers. Within these thick walls it was cool always, and through the wide doors and windows, opening upon front and rear, the breezes from off the river came in unchecked. As the day wore on and the fiery sun was gone, the company sought the terraces and sauntered in the long twilight, looking down upon the purpling bosom of the James. The veranda, so essential a feature of our modern country houses, was not in vogue in the English prototypes of these colonial manor-houses, and was, therefore, not a part of the construction of the great river mansions, except in one or two instances.

As the days grew cold great wood-fires roared on the capacious hearths of the principal rooms; there was none in the hall. A richly-dressed throng of guests wandered at will from room to room in the more or less brilliant illumination afforded by candles in the sconces on the panelled walls. In the spacious dining-room the great oak board groaned beneath the weight of sumptuous feasts, and on the buffet stood the mighty punch-bowl to be emptied and refilled again and again, while flanking it were sparkling cut-glass decanters filled with wines of Spain, of Oporto, and the blue Canaries and cob-webbed bottles of old Madeira from the vaulted cellars below. On small tables in the library were urns of coffee and chocolate at which the ladies, *très décolletées*, in rich brocades, their pretty feet encased in high-heeled slippers of red satin, their heads a wonder of feathers and powder, patches and paste, ministered unto the wants of gay cavaliers standing about with their cocked-hats under their arms, and resplendent in gold-buttoned laced coats of costly stuffs, flowered waistcoats, satin knee-breeches, diamond buckles, powdered hair or frizzled wigs.

Meanwhile, in the small house, on the right of the main building, where the kitchen was established — for in colonial country houses



Carter's Hall.

of the better class the cooking was usually done under a separate roof — was a throng of negro domestics. The cooks crowded around the great fireplace in which the cranes swung laden with pots and kettles, and tended the spits which depended by hooks from the cob-irons, and slowly turned their burden of venison, wild-turkey, quail, or the humbler barn-yard fowl, to the glowing coals and the blaze of great logs heaped upon the fire-dogs. The younger negroes, plying in a steady stream between the houses, rushed to and fro with the innumerable dishes of the feast, and all hands halted now and then to refresh themselves with a draught of home-made persimmon beer.

This grand manorial seat was the abode of the rich and hospitable planter, Carter Burwell, who, besides being of distinguished family in his own person was very highly connected on the side of his wife, a daughter of "King Carter," one of the wealthiest and most noted planters in the colony. They and their descendants were people of the highest fashion in ante-Revolutionary times, and their home was the scene of many great dinners and routs and balls of brilliant splendor.

It is interesting to trace the wonderfully rapid evolution of the settler's habitation from the first rude shelter of bark and boughs up to the luxury and refinement of the princely residences of a century later. The men of the first companies lived in bark huts exactly copied after the wigwams of the Indians; and, indeed, so quickly did the charm of the wild untrammelled life of the wilderness conquer the traditions of their old-country home that many of them stuck to the wigwams long after a considerable civilization had developed in the colony.

Succeeding these came the house of logs, pine-trunks of medium size being at first merely cut into lengths, notched at the ends and laid up round; but soon, the first winters having developed an unexpected severity of climate, they were hewn square and the spaces between the logs carefully chinked-up with clay.

The primitive and unhealthful dirt-floors were superseded by a pavement of puncheons sawed from the butts of logs, and rude chimneys were built of sticks fastened together at the angles and roughly smeared on the inside with clay or plaster. The stack was carried up against one of the end walls of the cabin and on the outside — just as they are built to this day in the hovels of the poor negroes and whites throughout the South, which are, in fact, hardly an improvement upon the rude original we are describing.

The splitting out of rough shingles and clapboards from the clear butts of the larger timber marked an important advance.

Nails were very scarce and many houses were built entirely without the use of iron, thongs of rawhide and wooden pegs being used instead. Timbers were laid across the shingles to prevent them from being lifted by the wind. Bricks were made in Jamestown a very few years after the first landing, and were soon in general use for the lower-story walls. The oyster-shells, found in great heaps upon the river shores, yielded an excellent lime when well-burned, and a concrete of shells and lime was used in walls which are still to be seen. With the introduction of the female element into the community, home-rearing in the wilderness went forward with greatly renewed energy, and from this time a steady improvement in the style and importance of their houses is discernible.

In 1619, some ninety young women were sent out from England and speedily found husbands among the pioneers. In 1621, one widow and eleven maids were landed in Jamestown, all of whom were mated without loss of time, their husbands paying 120 pounds of tobacco apiece for the cost of their bringing-out. For each of the thirty-eight women, who arrived in the next consignment, 150 pounds of tobacco were given.

Tobacco was now the great staple of commerce and medium of exchange between Virginia and the mother-country, and as its cultivation became more profitable land was rapidly cleared, the colonists began to give up the old community system, abandoned Jamestown, and, establishing themselves upon broad plantations, entered upon an entirely new phase of colonial life, individual families living now in an isolation which was in strong contrast to the old order of things, and much better calculated to call forth the courage and latent energies of the settlers.

Gradually the habitation of the planter of middling estate grew into the type of which we find so many houses in the older parts of the colony, plain, comfortable, one-story houses, having usually a curb-roof pierced with dormers, four square rooms arranged about a hall of goodly size, and a great square chimney-stack rising out of the middle of the building.

These considerable improvements in the condition of the colonists had been brought about mainly by the firm hand and wise head of Sir Thomas Dale, who, arriving in May, 1611, as "High Marshal of Virginia," had at once set about reforming the abuses which were sapping the energies and obstructing the progress of the infant colony. One of his first acts of government was to do away with the old communal system under whose miserable defects the settlements had, until his arrival, been hopelessly struggling. Heretofore the law had required that everything should be brought to the "common store," from which the whole community drew its subsistence, every one sharing in the results of the labor of the entire body. The consequence was that as no one could hope to profit, especially by the fruits of his own industry, the most of them found it pleasanter to do nothing at all, "presuming that, however the harvest prospered, the general store must maintain them," and so they passed the time agreeably playing at bowls by the roadside, while a very few of the more diligent planted and tilled the corn which was to feed them all through the long dreary winter. When that gave out, as it usually did, they relied upon the uncertain hope of cajoling the Indians into giving them more. But the iron will of Dale soon made an end of all this. He required that every man of them should work his allotment of three acres of cleared ground, giving to the public granary two-and-one-half barrels of corn, and disposing of the rest of his crop as he pleased. Each one must provide himself with a home of his own, however rude. In a few years, when he saw that this new order was bringing forth good results, the Governor obtained from the London Company a grant of fifty acres for every man who would undertake to clear and cultivate that amount, paying a small yearly rental to the King "at the feast of St. Michael the Archangel," or he might select and take up one hundred acres on the payment of twelve pounds or so, or, were he fortunate enough to earn the gratitude of the Company by some important achievement, he might look for reward in the shape of larger grants to the extent of two thousand acres, not more.

But one thing more was wanted. The colonists had now made homes for themselves. They wanted wives to put into them. Sir Edwin Sandys, President of the London Company, set about supplying the want. He had already shipped over twelve hundred men to Virginia, and King James had contributed a hundred convicts, the latter not meeting a very cordial welcome, Sir Edwin now got together ninety maids of fair repute and sent them over to find husbands. It was a great stroke. On the arrival of the ships there was a rush to Jamestown to view their fair freight, and there were doubtless some curious incidents of courtship, novel and rapid. The company had made careful selection of the girls. There were only two black sheep in the flock, and these were shortly sent home again. The others were wooed and married without much loss of time. The company had directed that "in case they cannot be presently married, we desire that they be put with several householders that have wives until they can be supplied with husbands. . . . We desire that the marriage be free, according to nature, and we would not have these maids deceived and married to servants, but only such freemen or tenants as have means to maintain them . . . not enforcing them to marry against their wills."

So were complete homes founded at last in the wilderness, and with houses and lands of their own, and wives and children to work for, the Virginians were far on the road to permanent prosperity. The "servants," referred to in the Company's order concerning the young women, were indentured persons and sometimes convicts: the first black slaves to arrive in the colony were brought in a Dutch ship which sailed up the James River in 1619, and sold twenty Africans to the tobacco-planters.

Sir Thomas Dale having, in five years accomplished so much for the betterment of the colony, went back to England in 1616, and his arrival there is thus chronicled: "Sir Thomas Dale has arrived from Virginia, and brought with him some ten or twelve old and young of that country, among whom is Pocahontas, daughter of Powhattan, a king or cacique of that country, married to one Rolfe, an Englishman. I hear not of any other riches or matter of worth, but only some quantity of sassafras, tobacco, pitch, tar and clapboard — things of no great value, unless there were plenty and nearer hand. All I can hear of it is, that the country is good to live in, if it were stored with people, and might, in time, become commodious. But there is no present profit to be expected."

At this time the population of Virginia was reckoned at three hundred and fifty-one; thirty-eight "men and boys" at Henrico, of whom twenty-two were farmers; one hundred and nineteen at Bermuda Nether Hundred; twenty-five men at West and Shirley Hundred; fifty at Jamestown; the rest at Kiquotan, Dale's Gift, and elsewhere. The cultivation of tobacco was begun in this year.

In 1617–18, there were in Virginia about four hundred settlers. Four hundred and fifty bushels of corn came to the granaries, and the property of the colonists in cattle was considerable. Stringent laws for the government of the settlers were enforced. Immigration was greatly increased in 1619, and in July, 1620, the population had reached four thousand persons, and settlements had extended to the York River. An effort was being made to teach and Christianize the Indians. A. B. Bibb.

(To be continued.)

Anti-corrosive Pigments. — An interesting series of experiments has been conducted by the Dutch State railways for the purpose of ascertaining exactly the relative resistance of various pigments to atmospheric changes and to the corrosive action of sea-water. The results have proved that the red-lead paints are less affected by atmospheric influence than those that are composed of the brown oxides of iron, on account of their adhering more closely to the metal and of their possession of greater elasticity. It was also discovered that any sort of paint afforded an increased protection if the plates were pickled in hydrochloric acid before its application. The prevention of corrosion by salt water was found to be possible by the admixture of the oxide of some electro-positive metal, such as caustic lime and soda, but the efficiency of such a covering was destroyed when its alkaline properties had been neutralized by the absorption of carbonic acid. Magnesia, however, was proved to be most serviceable, seeing that it does not absorb carbonic acid, and not only does it protect the iron from galvanic action, but it also does not affect the anti-fouling qualities of the paint. — *Pittsburgh Dispatch.*

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

M. E. CHURCH, MADISON AVE., NEW YORK, N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print, issued only with the Imperial Edition.]

A DESIGN FOR THE TOMB OF AN ILLUSTRIOUS ARCHITECT, BY MR. NORMAN ST. CLAIR.

This design, which is intended to typify the seven lamps of Architecture, was not finished in time to be submitted in one of the recent competitions of the New York Architectural League.

ARTISTIC HARDWARE MANUFACTURED BY MR. A. G. NEWMAN.

See article on "Builders' Hardware," elsewhere in this issue.

STATUE OF DANTE, PARIS, FRANCE. J. P. AUBÉ, SCULPTOR.

See article elsewhere in this issue.

HOUSE OF HENRY TETLOW, ESQ., ALLEN'S LANE, CHESTNUT HILL, PA. MR. T. P. LONSDALE, ARCHITECT, PHILADELPHIA, PA.

A CHATEAU AT YVETOT, NORMANDY, FRANCE. DRAWN FROM A PHOTOGRAPH.

AN ARCHITECTURAL KNOCKABOUT.[1]—V.



San Frediano on the Lung' Arno, Florence.

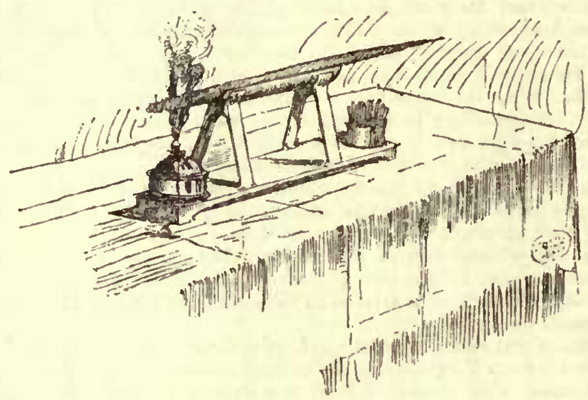
I WENT from Pompeii immediately to Naples, and from there to Rome. I arrived early in the morning, I remember, having sat up all night in one of those cramped little compartments where it is absolutely impossible to get a good night's rest, as you cannot stretch your limbs without putting your feet in some other man's face, or being stopped by a division partition in the middle of the seat. I had selected no hotel, and I remember how I walked around the streets of Rome trying to find lodgings, and the sensation I caused, by finally marching into the swell banking-house of Mackay, Hooker & Co., with my knapsack slung on my back and an unkempt beard, to get my *poste restante* letters. Here at Rome I revelled in the classics, of course, though everything was exactly as I had pictured it. I was particularly interested in the catacombs, and those on Cappucini Hill engaged my attention the most. I was given permission to make a sketch of some of them, which I did in the dusky light, while a hooded father watched me closely, fearing, no doubt, that if left alone I might purloin some decayed old tooth, or hide away a crumbling knee-bone of some departed monk. I was by far too scared to think of relic-hunting — a practice which has been carried to such an extent, that it has become a crying shame. These thieves — for such they are — do not content themselves with picking up, say a loose stone in some mosaic at Pompeii, but will (as I have seen them do) produce a tiny hammer, which they keep concealed on their person, and break and destroy some beautiful and carefully-guarded mosaic composition — that is, if they can do it unobserved. They will also chip off a piece of the fluting on some fine column or break a piece off some beautifully carved acanthus leaf on some Corinthian capital if they can get at it, — and these vultures generally can get at anything, when they want what they call "relics." The pity of it all is that most of this damage is done by our own enterprising countrymen.

In Rome, I did as the Romans do, although I was not long enough in the city to become very well acquainted with the habits of the people. The *café* life in Rome is fascinating. Every evening I would sit for hours among the crowds of women and officers all taking their coffee and "groc" in long, thin, vase-like glasses, the men smoking the same long Italian cheroot, which they would burn on one end



In a Catacomb.

for fully ten minutes in a brazier provided for that purpose, thus getting a good light and abstracting a great deal of the nicotine. I, of course, indulged in all the various beverages that the etiquette of the *cafés chantants* constantly compel one to drink. It was very interesting to see the officers stride in with their swords clanking and dragging on the floor, and I was greatly amused at the antics of the military students who were "gotten up" nearly as regardless as their superiors. I was convulsed one day by a funny incident that took place on the piazza before my eyes and which I



A Cigar-lighter.

was powerless to prevent. A near-sighted English tourist with his field-glasses slung over his shoulder and a very evident guide-book in his hand, was searching for "Cook's Excursion Office." As it happened, he was standing directly in front of it, with his back, of course, to the sign, and was busily engaged in searching every other sign on all the other sides of the piazza. A guide with his usual saturnine instinct pounced upon this poor unfortunate gentleman and asked him if there was anything that he could do for him? "Yes," the old gentleman answered, "tell me where Cook's office is." The guide shrugged his shoulders and said he would take him there for two lires, as it was a loss to him to show him to his destination for nothing. The other, being in a hurry, told him that he would give him one, but the guide was adamant, so the bargain was made and the aforesaid fiend marched that poor old man away around the whole piazza, up Cappucini Hill, steps and all, the Englishman puffing and wheezing all the time, till finally he brought him back to the identical spot, and showed him the office. The guide got his two lires, the tourist never perceiving the fraud. I laughed till the tears rolled down my cheeks, but perhaps I should n't have, as maybe the same trick has been played on me numerous times: it was funny all the same.

My great regret was that I could n't stay long enough in Rome for the pleasant weather to come in order to make some out-door sketches, as at that time it was impossible, but, in this day of photographs, I could get photos. of all the objects of interest I wished. As every artist or architect has from time to time sketched the same

[1] Continued from page 62, No. 711.

objects in Rome and elsewhere, I confined myself rather to the unique and unusual. I visited all the museums, the Vatican, the Sistine Chapel and the galleries, and did the usual things that every



Sante Maria del Salute, Venice.

traveller does, and did them thoroughly. After a stay of twelve days I left the Eternal City for gay Florence.

At the latter city I had a most charming time, luckily finding an aunt who made me "wash up" and be presentable. It was a godsend to meet some one of my own family after all I had gone through. I went heart and soul into the carnival which was then going on at Florence, distinguished myself by my ability to land the proper amount of *confetti* upon some lovely head, and made a great hit the last and miscellaneous day by my skill in throwing oranges, bricks and candy-balls. I rode horseback, went to Germans, and finally won a tennis tournament. It seemed very strange to me to be in ease and comfort again, in contrast to my late shabby condition and my experiences in third-class carriages and as a common deck passenger.

Bidding a regretful adieu to dear old Florence, I went to Venice where I found, on my arrival, two inches of hail on the piazza and more coming. Venice, you know, is somewhat of a moist place at best, but this extra coat of congealed water dampened my ideas as



Palazzo Widman, Venica.

to its loveliness. Yes, it is glorious; every one knows that. It was bitterly cold though, and after a sojourn of three days and two nights I left for Milan; from thence (greatly out of my way) to see the Lion at Lucerne, only to find on my arrival that it was "boarded up" and had been so for two months. I said very few kind things of Lucerne at that time. F. L. V. Hoppin.

[To be continued.]

THE RAILROAD UP MT. PILATUS.

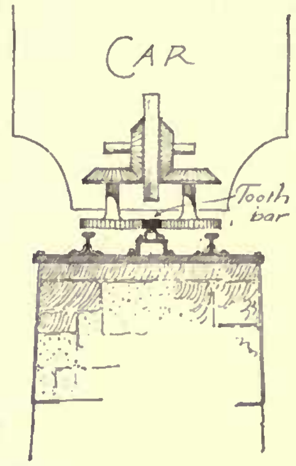


THE steepest tooth-wheeled railroad in Europe has just been opened in Switzerland, the projectors and builders being Messrs. Locher and Edward Geyer, of St. Gotthard fame.

As I happened to be one of a party which undertook the first trial-trip in June, I attempt a brief description of it for the *American Architect.*

Generally, Pilatus is reached from Lucerne, but our trip was made from Zurich. We travelled by rail to Zug, and down the Vierwaldstätter Lake by boat to Alpnach Staad. The latter is the valley station, as the Swiss say, of the Pilatus road — a mere collection of steamboat docks and inns nestled at the foot of the mount. One steps almost directly from the boat-landing up into the railroad-station. The latter is roofed, and has the usual look of such places. The locomotive stood tipped on its hazardous incline inside, panting in short breaths, in its hollow between the flights of stone steps on either side. The space was dark and the engineer ran the car out into the light, while our party descended to the road-bed to examine the rails and car-wheels.

Pilatus is not a granite Alp, but a limestone one. The bed of the road that hugs and follows the contour of the mountain was, therefore, cut with tolerable ease. The tunnels were bored and the whole extent of road, 4455 metres in length, was laid during the space of two years, although the hot months of the year alone proved practicable for work. But while a minimum of cost was had in respect of the time employed, an expense grew up, on the other hand, by reason of the necessity of transporting crystalline rock for the road-bed. The native limestone and conglomerate were unreliable. The force of the wind on this mountain is notorious, and, given a perfect adhesion of a car to its rails, a danger, in a moment of pressure from it, arises from the loosening of the earth or fragment of rock to which the rails are anchored.

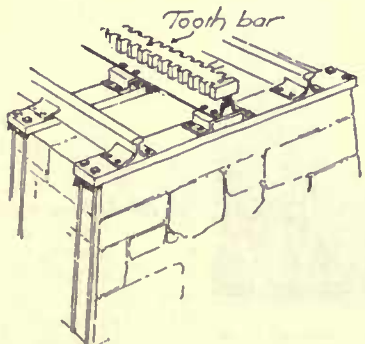


A solid wall faced and covered with granite blocks is, therefore, made to form the road-bed. Iron cross-beams are fastened to this bed by long anchoring-bars griped into the granite exterior of the wall. On these beams the iron rail and tooth-bar are screwed, with the tooth-bar in the middle. The bar is somewhat higher than the rails, is of soft steel (Martin), and has a double row of vertical teeth.

The tooth-wheels of the car, which grasp into the bar, are arranged in pairs (see drawing), while the axles of the wheels are perpendicular to the road-bed.

The axles of the Rigi and all other tooth-wheeled railways are horizontal. The Pilatus arrangement renders a heaving of the tooth-wheels impossible, and is the feature that forms its novelty.

A number of further details were of interest to the engineers of our party, as, for instance, that the holes of the steel screws that fasten the tooth-bar to the iron cross-beams were bored upon the spot. The latter are of cast-iron, but the supports of wrought-iron. Where curves occur, the teeth of the tooth-bar were first cut out of the solid, straight block and the bar then bent.



And then as respects the brakes and their connections: these act in the form of snail-wheels upon the upper pair of tooth-wheels. During the ascent of the mountain these snail-wheels remain stationary. On descending they also turn, and, indeed, at the rate of three hundred rotations in a minute. The slightest friction will stop the car.

The car itself is composed of machinery and passenger compartments in a single carriage, the whole being ten and a half metres in length and a little over two metres broad (2 m., 20 cm.). Passengers sit, going up, in the front portion, which is divided by two

partitions into four *coupés*, with room for thirty-two persons. The engineer has his station behind, while the machinery and boiler (of twelve atmospheres), that lies crosswise, occupy the space next the division-wall between the two portions. A conductor stands on the platform in front, or, on coming down, in the rear. The whole is supported by two pair of wheels, each with its twin tooth-wheels in their middle on the central toothed bar.

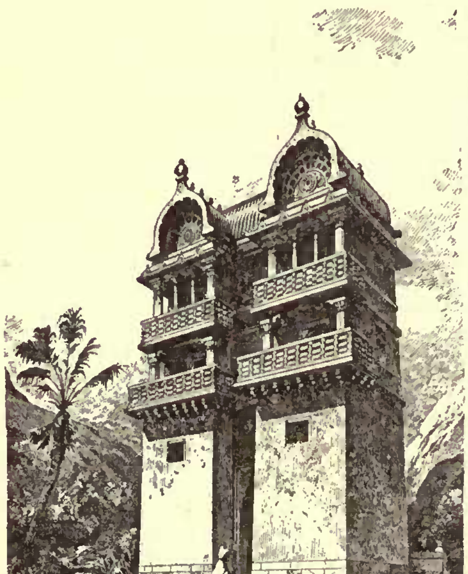
Brakes are supplied to each of the four wheels, and two claws are attached to the upper running axle, that clasp the head of the side-rails and prevent the car from being blown over by the wind.

The ascent is steep from the start. The passenger who mounts into the car and takes a seat finds his legs hang normally under his body instead of before his face. The sensations of laymen are not more creeping and horrible, perhaps, than along other mountain routes: I, for my part, find them all such an exquisite form of torture that Dante has not the least effect on me since I first underwent it. The picturing of one's anatomy later, when safe on a horizontal bit of natural ground, as it must have looked a moment before with every individual bone grasping the arms and rim of the car-seat spasmodically, while the eyes in one's head bulge out in fascinated fixedness upon the precipices an inch from one's base — even this post-caricature of fidgetiness hardly compensates for the original experience. The average incline on the Pilatus road is 42°, the highest, 48° — one of the steepest points being that beyond the viaduct over the Wolfort chasm to the upper Wolfort tunnel, on the first half of the way. A meadow that is there attained affords space for a double line of rails and a watering-station: the incline here is scarce 12°. Then follows the second half of the ascent and the winding round the whitish, barren peak of the Esel. The passenger finds himself alternately in the bowels of tunnels and clambering against the side of the exposed mighty wall, his car a mere spot in the dizzy wilderness of ether and precipices. The surveys and first cuttings here were made possible only by lowering scaffolding on ropes from the heights above, reached from the other or northern side of the peak. At the end of the last ascent, which is again at 48°, the locomotive stops at the summit station, having laid back 4,455 metres of road for a height of 2,076 metres. (Mr. Gautsche, of the Zurich Polytechnic School, who collected the above data for me, assures me that the height of 2,070, given by Hardmeyer, is inaccurate.)

The basins of the Vierwaldstätter Lake, with its chapel of William Tell, lie at one's feet, and before one the panorama of the Alpine world. Science has put no sublimer sight within the reach of man.

COUNTESS V. KROCKOW.

JEAN PAUL AUBÉ. — I.



Hindoo House at the Paris Exhibition, designed by M. Charles Garnier. From *Le Moniteur des Architectes*.

JEAN PAUL AUBÉ was born July 4, 1837, in the village of Longwy, Department of Meurthe-et-Moselle, in the province of Lorraine, of parents in good circumstances. His father, a foreman in a large iron foundry, meeting with pecuniary reverses, came with his family to Paris in 1847 to seek a better fortune. The boy, Paul, had already begun to exercise the prevailing inclination of his nature by decorating with his pencil every object that presented a plain surface, caring nothing for study of any kind. To his father, who knew nothing of art, this persistently followed and infantile pastime was anything but amusing, and, not knowing what to do with the boy, he sought the advice of a friend of the family. "Send him to a drawing-school and let him have his own way," was the just appreciation of the counsellor. Paul was accordingly sent to "La Petite Ecole," in the Rue de l'Ecole de Medicine, at the age of twelve years — that famous cradle of art-teaching where so many distinguished French artists first began their studies, and to which all turn with the pleasantest memories and the warmest gratitude. There Paul met and formed life friendships with La France, Dalou, Barrias, Delaplanche and many other of the prominent artists of to-day, who, like him, were destined to help form the galaxy of famous French sculptors and painters.

The forenoons were devoted to drawing, and the afternoons to the automatic performance of the routine of the day-school of his quarter. At home, he cut and carved every object that would respond to the edge of a knife or chisel, and the stone balustrade of the house in which he lived was the object of his most friendly attention. Nor did he desert it until it had been transformed into all the images that it could be made to represent. Thus the boy lived and played until 1856, when he entered the Government School of Fine Arts, or rather, went into the private studio of Duret, one of the professors of sculpture, as at that time there were no studios on the premises of the school. As Duret was too ill to give instruction to his pupils, the youth derived but little advantage from being with him, though he went to the studio more or less steadily for many years.

Paul's father, finally becoming convinced that his son appeared to be good for nothing but a sculptor, very sensibly decided that the sooner he began actual work with a person of that profession, the better it would be for all concerned. At this time, the younger Danton was enjoying a wide notoriety in Paris among common people, but no reputation among artists, and to him the father took Paul, with the intention of placing him as an apprentice. But the sculptor received neither pupils nor apprentices. He, however, advised the father to go to his brother, the elder, or grand Danton, as he might be willing to receive a pupil. He also asked the father this rather disturbing question: "Are you rich enough to support your son while he pursues the art of sculpture? For I must tell you that the life of a sculptor is a hard and uncertain one, and the profession in anything but good repute in this community, bringing in little money and less fame."

To the grand Danton they went, but with the same result as at his brother's. He, too, advised the father in regard to the precarious profession of sculpture, but suggested, as the son must work to earn his bread, that he should be apprenticed to a plaster-moulder, as that trade was more certain of providing at least a living to those who followed it, and was happily exempt from the odium generally attached to a sculptor who was unsuccessful in gaining money. And this advice came from a *Grand Prix de Rome* and a sculptor of talent as late as 1860!

Young Aubé was accordingly bound as an apprentice to a plaster-moulder named Marminia, a Savoyard, with whom he began to mix plaster in dead earnest. This pleasing occupation, though having charms of its own, was not in the highest degree satisfying to the taste of the young artist, and, though he worked hard and industriously, he could not see that he was working in the line of future eminence. He preferred to make things rather than cast them, and he took every chance that offered to gratify this preference. Fortunately, the moulder was a man of sense and heart, and he quickly appreciated the true bent of the boy's genius. To the elder Danton the moulder led his apprentice, and the sculptor, this time, consented to receive him as a pupil. With him Paul remained for nearly five years, though earning no wages and living in great poverty. Such a state of things was not encouraging; some extra exertion must be made to gain more of the bare means of existence. There was only one way to which the sculptor could turn, the way followed by all poor students in sculpture, and that was to try to make little busts and figures to sell to art-dealers. Paul, therefore, began to make figures and groups for the porcelain manufacturers, and, though he worked on them for weeks, he could only get from two to ten dollars each, and glad, even, to get that.

During all these years he had no idea of any earthly happiness save that of the typical Paris *gamin*. To do as he pleased, without thought or care for the morrow, never seriously disturbed by poverty, however distressing, and having one object only — to make sculpture. Every day was its world. He had no ambition, no plans and no serious anxieties. The fancies of the day sufficed him, and his life passed as simply as the days and months came and went. In this deliciously enviable and truly sylvan ease Aubé lived then, and so continues to live to this day. It is the true life of an artist. His mind is to him a daily and permanent kingdom. He expresses it in his work, and adds to his kingdom a paradise.

Aubé still kept up a desultory attendance at Duret's studio, and gained, now and then, some modest school recompense in the way of mentions and medals, but never obtained what is understood as a school success. His porcelain enterprise did not succeed very well, and, leaving Danton's studio, he began to earn his own living by working for his school comrades who had been more fortunate than he in their professional relations with the world. This he continued to do until 1868, when he went to one of the provincial cities to fill an engagement with a manufacturer of *Bons Dieux*, or one who makes statues for religious purposes. Aubé made this engagement in order that he might make and save more money than he could in Paris, so that after a few years of economy he might be able to execute a figure for the *Salon*. Success at that bar of art-judgment is considered to be the first popular object to be attained by all artists, foreigners as well as Frenchmen. For the latter it generally means medals, professional reputation and honor, and, above all, work from the Government. To gain this, Aubé determined to forego for a while the pleasures of Paris art-life, of which there is no description, and to take his chances in the tranquil surroundings

of a provincial city. In this enterprise, as with the porcelain figures, he did not succeed, and at the end of two years he was worse off than ever, both in mind and pocket. Debts hung heavily over him, and the misery of poverty appeared in no comforting form.

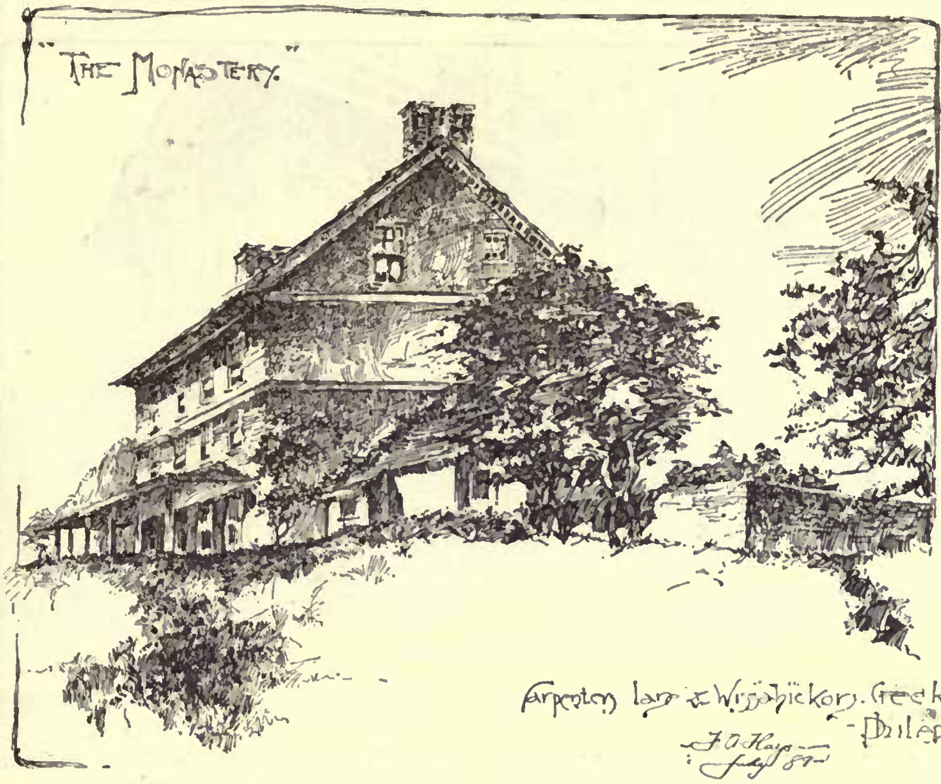
He longed for Paris. At this moment the Franco-German war broke out, and the sculptor, filled with patriotism and forgetting his woes, hastened to that city and joined the National Guard. In it he served until the close of the war, sharing all its reverses and suffering all its privations. During that time he had some spare hours, and he spent them in working for Cugniot, a Paris sculptor.

When peace came he returned to his home in the provinces, gathered together the few fragments of his furniture left by the Prussians, paid his debts, and returned to Paris with his wife and little daughter. And there he began over again his plan of winning honors at the *Salon*.

Aubé regards the breaking out of the war as his salvation, for it brought him back to Paris, the place of all others where he ought to live. If the war had not come he would, in all probability, have remained where he was, lived a useless life, so far as art was concerned, and his country would have lost one of her best sculptors.

Again in Paris, Aubé resumed his work with his fellow artists, Cugniot and Falguière among the number, though still preserving a professional independence.

Soon after the close of the war the *Figaro* newspaper began to erect its new building, and it opened a general competition for a statue of the historic character whose name it bears. The contest was the talk of all Paris until it was decided. Aubé's sketch received a "mention" in money, and, as one of the prizes, was preserved in the office of that journal.



In the *Salon* of 1874, the sculptor exhibited his first public work, "The Syren," and received a third-class medal. It was bought by the Government for one thousand dollars, cast in bronze, and placed on the Promenade, in the city of Montpellier.

This event was the beginning of a gradual professional success, which has eventuated in the year 1888 in his being the author of the sculpture of one of the best two monuments in France: that on the one erected to the memory of Gambetta, in the Place du Carrousel. The other is the group by Rude, on the Arc de l'Etoile.

Aubé had now simply to go on in professional success: with reasonable industry his future was assured; he had passed the turning point in his life.

In 1876, the sculptor exposed a statue of "Galatea," for which he received a recall of a second-class medal, and sold his model, executed in marble, to the Government for sixteen hundred dollars. It, also, was sent to Montpellier. He was now generally recognized by artists and amateurs as a sculptor of singularly good taste, excellent ability, and of unusual loyality to what is understood by the more exacting judges as good sculpture. His methods were simple and straightforward, he depended entirely upon nature, and had nothing to do with working from plaster casts, or employing any of the easy ways of producing statues.

Somewhere about 1876, Haviland, the great porcelain manufacturer — who, by the way, is an American — engaged Felix Bracquemond, one of the most eminent of French engravers, to take charge of the art-department of his establishment. Both determined to bring the productions of the house up to as high a degree of artistic expression as it was in their power to do, and one of the important steps in this proposed progress was that of decorating each vase that they made by modelling directly upon it, instead of applying to its surface duplicate forms that had been stamped or pressed in a mould, and that this should be done by the best sculptor that could be procured. To accomplish this purpose, Bracquemond applied to Aubé for assistance, and the latter consented to go to Auteuil, where the factory was situated, to work. Every morning on his arrival a fresh vase was given to him, and he spent the whole day, as a general thing, on each one. For the most part, the decoration consisted of one or more graceful nude female figures, but occasionally a more elaborate design was executed, which consisted of vines, cupids, nymphs and various other motives. One of them was called "The Aurora Vase." On one side was represented the Goddess of the Morning behind her prancing steeds; on the other, a falling figure of Night.

Aubé executed more than three hundred of these beautiful objects, each one marked with his initials. As they gradually appeared upon the market, they attracted an immediate and appreciative attention, soon followed by a veritable arti tic craze. Porcelain and art lovers purchased them with the liveliest avidity, and the critics complimented both artist and manufacturer in the warmest terms. The pecuniary result to all concerned was most satisfactory, for they were not only novel and varied in design, graceful and free in their execution, but they pleased the general public as well as the artists. They also demonstrated the extraordinary fertility and readiness of the sculptor's capacity of artistic invention, and to an extent extremely rare in any period of art-expression.

In the *Salon* of 1877, Aubé exhibited portraits of his two children, and the bust of a lady, and in 1878 his marble statue of "Galatea," for which he received a second-class medal. In the following year he appeared with a plaster statue of Dante larger than life. It placed him at once among the strongest sculptors of his country, in the estimation of both artists and critics. He also exhibited at the same *Salon* a fine statue, in plaster, of "Agriculture," destined for the Trocadéro Palace. But strangely enough he received no recompense, though the city of Paris bought the Dante and cast it in bronze.

Public competitions for statues and monuments were at this time of almost weekly occurrence, and the sculptor entered into many of them. He made a sketch for a standing statue of Rabelais for the city of Tours, and received the second prize, the city taking the sketch. In the next essay, for a monument to the National Defence, he also came off second best, and the jury recommended the city of Paris to execute the sketch. Soon after he made another sketch for a sitting statue of Rabelais, winning neither recompense nor recommendation. Though unsuccessful with committees, Aubé gained decidedly in reputation. Both artists and critics recognized his merits and were not slow in prophesying for him an eventual future of professional good fortune.

T. H. BARTLETT.

[To be continued.]

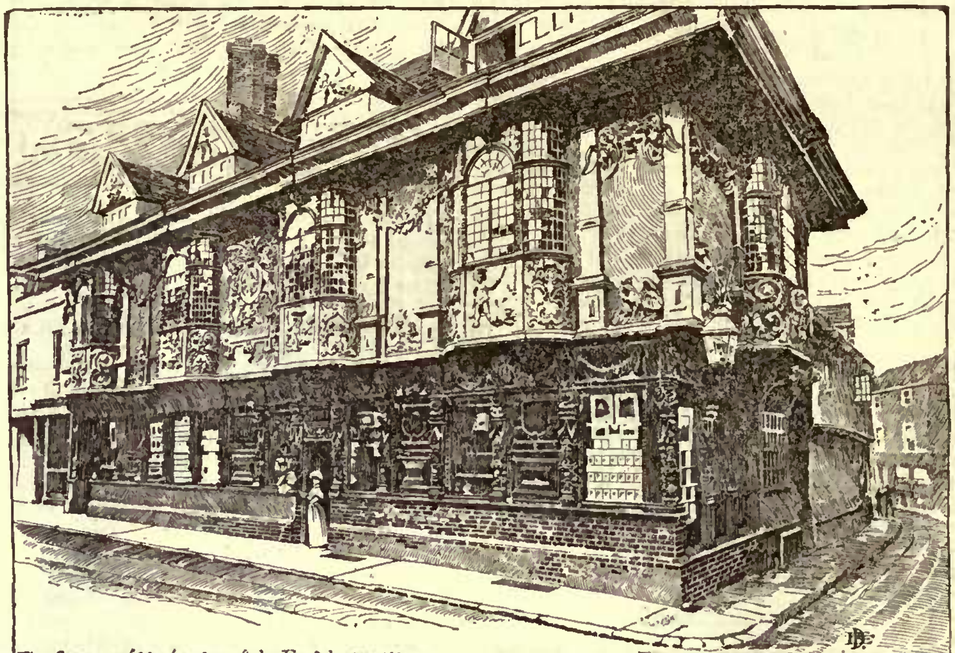
SEVEN YEARS OF EXCAVATION OF THE ACROPOLIS.



AFTER seven years of slow but continuous progress, the excavation of the Acropolis of Athens has at last reached its term. Almost the whole surface of the hill has been dug down to the rock, sometimes to a depth of twenty feet and over. The results, of which we are thus enabled to take stock, lie before the spectator in the new faces of walls and foundations brought to view; in the innumerable architectural fragments, drums of columns, capitals and moulding, cornices and reliefs, that strew the reconstituted surface of the tableland on which the original Athens stood, and, finally, in the marvellous archaic sculptures in the new museum which has been here erected for their reception. Much of priceless value has certainly been brought to light, but the traveller who can recall the Acropolis as it existed before the spirit of investigation had seized upon its present possessors will not regard its present aspect without a pang. Time may, perhaps, restore something of the

picturesque beauty at present diminished, but Time, alas! can never bring back the historical memorials, Roman and Byzantine, mediæval and Turkish — nay, even the monuments of the struggles of New Greece itself for independence, which have been ruthlessly torn to pieces in the search for more "Classical" relics.

Among the architectural relics brought to light are several new fragments of the Pelasgian walls, huge polygonal blocks, which followed the contour of the original crest of the hill, with rock-cut stairs and passages at intervals, several of which have now been opened out, and which together represent the defences of the earliest Athens of all — the Athens that existed before the Greeks took possession of the site and thrust out the indigenous inhabitants. At the point where this huge mass of archaic masonry abuts on the southeast corner of the Propylæa, the later Hellenic work of Pericles's architect suddenly breaks off, the finely-cut blocks being roughly cut away, so as not to interfere with the older line, and thereby, as Dr. Dörfeld has shown, hangs an interesting bit of architectural history. It is generally recognized that, according to Mnesiclides's original plan, the two wings of the Propylæa were to have been made to balance each other. As actually constructed, however, the southern wing is only about half the width of the other, although it is constructed in such a way that it might eventually be enlarged to match the other. The remarkable manner in which its corner is broken short off, rather than interfere with the old Pelasgian wall, affords, however, a clue to the mystery. This old wall had been used as the boundary of the Temenos, or holy enclosure of the Brauronian Artemis, and it thus becomes evident that the symmetry of Pericles's great entrance towers was given up in obedience to a religious outcry which he did not then find it politic to ignore, though the work was, at the same time, executed in such a way as to insure the possibility of carrying out the original design if circumstances should render it feasible at any future period.



The Sparrow House. Ipswich. Engd.

The most interesting site now uncovered is that which reveals the foundations of the earliest temple of Athena, alongside of the later shrine of her ward, the mythical Athenian king Erectheus. This was the chief original sanctuary of the Acropolis burnt by the Persians, and it was only at the time of the great restoration that the site of Athena's shrine was transferred to where the Parthenon now stands. But, perhaps, the most inspiring discovery of all is that which enables us in part to recover the actual sculptures of the principal pediment of this earliest Parthenon. The style of the work proclaims it to belong to the last decades of the sixth century B. C.

The existence of this ancient temple by the side, and partly occupying the site of the later Erechtheum, goes far to explain how, even in later days, when the temple had been transferred to the spot that it still occupies, a superior sanctity still clung to the ancient precincts. Here, in later days, was the special shrine of Athena Polias, the guardian of the city, containing the ancient olive-wood image to which, every four years, the solemn procession of the citizens made its way, bearing aloft on the mast of its galley-car the festal mantle or *peplos*, the birthday gift to the goddess. It is this procession, as is well-known, that forms the subject of the Parthenon frieze, and one of the most recent fragments of sculpture produced by the Acropolis excavations supplies a welcome addition to one of the central slabs of this great work.

Perhaps, after all, however, the most wonderful series of objects brought to light are the archaic figures. Many of these were found under the Acropolis wall erected immediately after the Persian invasion of 480 B. C., and the others from deposits of a similar kind also dating from the pre-Persian period. They may be divided into two principal classes: the early groups wrought in *poros* stone, and apparently derived from the pediments of early sanctuaries, and votive figures in marble. Of the pediment sculptures discovered, three relate to the combats of Heracles, and are of an entirely new character. The subject is a three-headed monster with winged, but otherwise human bodies, ending in the triple coils of serpents, which taper off to fill the gable end. The heads have pointed beards, curving slightly under the chin, of a brilliant blue color; the hair is also blue, the bodies red, the snaky coils banded alternately with red and blue. The monster represented is unquestionably Typhon, whose lower extremities were composed of serpents, and whose triple body is described by Euripides. He holds in one hand a flat object, the significance of which is uncertain, and is apparently engaged in watching the struggles between Heracles and the Triton.

The earliest figures discovered resemble those of that ancient island school of which Chios was a principal centre. In some cases the body is a mere trunk of stone, a reproduction of the rude wooden *xoana* that served as images in the most primitive days of Greece. Another survival of the earlier methods is seen in the fact that many of these figures have their heads and arms socketed and pegged onto the stock, as had been done in the case of the old wooden idols. These archaic statues have one and all a monotonous, meaningless smile, and the large staring eyes which, as seen in the primitive images of Athena gave her the epithet of the "owl eyed." The eyes, indeed, play a very important part in these early figures, supplying, as has been demonstrated by a series of observations, the canon of measurement for the whole face. The breadth of the mouth, the length of the nose, the position of the chin and brows are in fact determined by multiples of the diameter of the pupil, the outline of which (as is still to be seen in the old head of Hera at Olympia, which shows a central point and scratched outer circle) was first traced with a compass. The whole construction of the face is thus mathematical.

Another recently excavated group, which has not, indeed, been as yet fully pieced together, consists of two lions tearing down a bull. This group is in high relief, sculptured on several tufa blocks set side by side. It is of enormous power, and the effect it produces is heightened by the still brilliant coloring. The lions have scarlet manes; their bodies are of a paler red; their eyes black, with white pupils. The bull's body is a deep blue, in places turned to green, and from the holes torn in its hide by the lions' claws its life-blood pours in crimson streams down its flanks. The subject is wholly Oriental in its character, so much so that the theory has been broached that this group is one of the offerings made by King Crœsus, and that it was wrought by Ionian workmen sent over by him for the purpose.

But the later of the archaic figures found in the excavations of the Acropolis show a great advance on those more primitive methods. As illustrations of art-history they are of unique importance, since they afford us a series of examples of the early Attic school of sculpture as it existed during the decades that preceded the Persian invasion. Before these statues were discovered the real character of this art — which as carried to its highest point by Calamis and other masters, still drew forth the æsthetic tribute of the Greeks of later times, and took their place beside the works of Phidias and Praxiteles — was only tentatively to be gathered from a few isolated examples.

It now stands revealed to us in a whole series of works of infinite delicacy and refinement. Nothing is more interesting than to see the stiff archaic style thawing before one's eyes under the bright and genial influence of the Attic sky. The tresses of the hair — mere icicles before — fall gracefully about the shoulders; warmth and life begin to be infused into the contours of the body; the drapery hangs in more elegant folds; individual expression now peeps forth in the faces; the eyes are less staring and obliquely set; the chin is finer cut; the curve of the exquisitely modelled mouth dissolves in evanescent dimples, suggestive of that "holy and speaking smile" which was the distinguishing charm of this ripe archaic art.

Owing to a remarkable combination of discoveries, we are now even in a position to go beyond the mere general attribution of these figures to the early Attic school. A columnar base was found containing a fragment of a dedicatory inscription recording the fact that the statue which it had originally supported was the work of the sculptor Antenor, the author, it will be remembered, of the celebrated group of the Tyrant Slayers, Harmodios and Aristogeiton, of which a Roman copy is to be seen in the Naples Museum. On the top of

this base was a socket showing that it was intended to receive the two feet of a statue, and among some of the fragments of sculpture already brought to light Dr. Studniczka was so fortunate as to recognize the missing feet, and finally to recover the whole statue, with the exceptions of a few fragments here and there. The figure is that of a woman holding up the corner of her mantle, like early Etruscan figures of Hope. In her right hand, however, she seems to have held a fruit rather than a flower. The folds of the falling drapery are curiously undercut, being hollowed out two or three inches, and round the edge of the *peplos* runs a rich Ionic border of star flowers, with their petals alternately painted red and green. The *chiton* or tunic below is of a reddish purple hue: the hair, as in most of these votive figures, has been painted red. The eyes are inlaid with crystalline stones, and show iris sockets once filled with a darker material. The eyelashes are of metal. In the whole array of figures discovered nothing is more remarkable than the brilliant coloring, of which they still show evident traces. As a rule, however, the faces themselves and the broader surfaces of the drapery seem to have been left in plain white marble, the polychrome hues being reserved for the hair and ornaments, the embroidered borders of the mantles, and the tunic beneath, of which only a small part is usually visible. The showing through of the original marble surface thus eliminated the suspicion of an inferior material having been made use of, while the colors supplied to the rest of the figure a warmth and variety which the stone could never convey.

The ancient conventions, such as that which gave a crimson hue to the hair, are repugnant certainly to modern notions, and yet taking the figures as a whole, in spite of their original brilliance, there is nothing tawdry or barbarous about the coloring. To have had the privilege of examining one of these archaic statues, fresh from the deep deposit where it had lain since the days of Themistocles, is to have had revealed to one an aspect of Hellenic art too often forgotten by those whose knowledge of ancient sculpture is confined to the stock examples of our museums and galleries, which have long lost all traces of their pristine hues, and stand forth in a monotony of marble pallor. But the experience afforded by these Acropolis statues is unfortunately itself of a most transient nature. The hues, so fresh and brilliant when each several figure was first brought into the light, fade almost before the eyes of the spectator. Statues which I myself had seen at the moment of excavation, only a few years back, with mantle and tunic almost as gay as when they were painted, with bright eyes and rosy lips, are already dead and pale. Nothing can arrest the progress of this decay, and what in some of the more recently discovered statues may still to-day be seen by those who make a pilgrimage to the Acropolis, will in a few years be lost to sight forever.

Of the votive single figures the most characteristic are a series of archaic female statues clad in mantles and tunics, and in several cases holding fruit in their hands. They are probably to be taken as representations of the actual persons who made the offerings that they bear, and are intended, like those who upon the tombs bear food and drink to their departed friends, to perpetuate the offering, an idea as old as the oldest Egyptian monuments. The most naïvely simple of these, with her woollen tunic and peaked red shoes, has all the appearance of a peasant women; her shoes, indeed, are very like those worn by the Greek country people at the present day. — *Manchester Guardian.*

BUILDING LAW.

PARTY-WALLS.

ALBANY, N. Y., July 31, 1889.

Question. — Will you please send me any forms of deeds used in Boston that contain provisions in relation to party-walls and the covenants about the use, repair, etc. of the party-wall. It is unusual here to have party-walls, and I want to see the usual covenant, etc. used in Boston. *W. B. V. R.*

Answer. — It cannot be said that there is any special form of party-wall agreement in use in this city. We think that there is a prevalent notion among architects and builders that there is such a thing as a "party-wall" considered as a distinct species of property, with special legal attributes, and that there is some common form of words appropriate to creating such a kind of property. This idea, however, is entirely unfounded. Parties make such agreements as they see fit in regard to party-walls, as in other matters; and the result is that there are probably no two party-walls in Boston with identical covenants as to duration, height, privilege of extension, obligation to repair, etc. We had occasion recently to examine professionally the various party-wall agreements which are to be found in the "*Massachusetts Law Reports.*" The result was that out of twenty party-wall cases in our "*State Reports,*" twelve contained party-wall agreements, and no two of these were identical. Parties make such agreements as they please, and these are seldom alike for the reason that the wishes and necessities of adjoining owners differ in different cases as much in regard to the nature and duration of adjacent walls, as in other matters. Practically the most satisfactory way is for both parties to sit down with their lawyers and talk over among themselves the various contingencies which may arise, determine what they wish to have happen in such cases, and draw the covenants accordingly.

In qualification of the above it should be said that there is perhaps some approach to uniformity where parties are improving land in blocks. In such cases something in substance like the following agreement is very frequently found in deeds of real estate in the city of Boston.: —

"And if the granted premises or either of the lots adjacent there-" to as shown on said plan shall be built upon, partition walls may " be placed half on the granted premises and half on the adjacent lot; " and the owner of that one of said lots adjacent to that thus built " upon, shall, whenever he shall use said wall, pay one-half the cost " thereof of so much as he shall use."

A great many houses have been built in Boston under agreements similar to the above, but differing perhaps in some respects which might prove of great consequence in after years.

Under a form like the above, it is understood that no right of rebuilding exists in case the buildings are destroyed by fire or storm; and probably a wall once built under such a covenant could not be extended in height or length. If it is desired to give a right of extension, or a right to raise the wall, or to rebuild it in case of fire, the right should be expressly mentioned.

In regard to the provisions for payment, a difference of practice exists here. Some lawyers prefer to make the second builder pay half the actual *value* at the time of use; others prefer to use a covenant like the above which binds the second builder to pay half the first *cost.*

It should be added that the law concerning party-walls is in a state of considerable confusion, and builders and architects will always do well to consult a lawyer before attempting either to draft a party-wall agreement, or build into or upon or otherwise use an existing wall which they have heard was a "party-wall."

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE LONGITUDINAL SHRINKAGE OF WOOD.

RICHMOND, VA., August 12, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In that excellent book, "*Safe Building,*" by Louis DeCoppet Berg, F. A. I. A. Boston: Ticknor & Co., page 190, I notice the statement "xx; neither will timber shrink on end or in its length." This is a commonly accepted idea, but is a great mistake. All soft timbers, if not all of every kind, shrink in their length; the fine-grain, soft pieces, more than the coarse-grain, hard pieces in the same woods. There is in my office a drawing-board, eight feet long, three feet wide; made of two widths of white pine. It was finished with battens on one side, and was true in all respects; but after remaining in the office for some time, probably through two winters, the soft, fine-grain width had shrunk in length about three-eighths of an inch *more than the hard, coarse-grain piece,* the two having separated for some distance from the end.

"*Nicholson's Dictionary,*" Vol. II, page 430, says, "the length of timber is unalterable by seasoning or any kind of weather." This, too, is a mistake, and the illustration given about unseasoned timbers united together is not good; it only proves that timber shrinks more in width than in length of same dimensions.

Floors, ceilings and other boarding, laid in continuous courses, furnish abundant evidence of shrinking in their lengths.

Yours truly, ALBERT L. WEST, *Architect.*

NOTES AND CLIPPINGS.

THE OKEFENOKEE SWAMP. — There is in Georgia a terra-incognita of 600 square miles, known as the Okefenokee Swamp. It used to be the retreat of Indians, and during the war of deserters, but for fifty years it has been given over to the possession of bears, panthers, deer and smaller game. Hunters are occasionally tempted to go into the almost impenetrable morass, and they bring back wonderful tales of the richness of the soil and the wildness of the cypress jungle and the perils of the bog into which they have in places thrust poles to a depth of twenty feet through a black soft mud that appeared to be the vegetable mold accumulated through ages. In only a small portion of the swamp can a good footing be had, and those who have penetrated the other portion have floundered through after almost superhuman exertions, men having fallen into boggy places from which it required the efforts of three or four comrades to extricate them. Several attempts have been made to organize companies to drain the swamp, but all have failed for lack of capital. Now Marshall P. Phillips, through his agent, A. B. Linderman, who made the contract with Florida for Hamilton Disston, proposes to the Georgia Legislature to pay 12½ cents an acre for the

swamp, and to deposit $20,000 forfeit for the carrying out of his contract. Mr. Phillips is reputed to be worth something over two millions, and has made several investments in the South. The territory he proposes to get for this sum is about two-thirds the size of Rhode Island, and by the survey of Gen. Gilman in 1879 contains 624 square miles, or 399,360 acres of land, which when drained will be equal to the best cane lands of the Mississippi River bottoms. Mr. Linderman claims that the drainage will cost $500,000, and it is probable that it will come inside of that amount, for the Disston Company has completed the drainage, except as to excessive rainfall, of 500,000 acres at a cost of something over $400,000. They will have to widen the canals some on account of the excessive rainfall at times, as the legislative committee only allowed them 90,000 acres as drained because on a tour of inspection they found the heavy rains had flooded temporarily a large part of the swamp. It will probably cost them $1 an acre before they get through with it. At Mr. Linderman's estimate the Georgia swamp will cost $1.25 an acre to drain. When that is done the land will be worth on the average something like $10 an acre. As this is the only State land available for the school-fund, it is natural that there should be some opposition to its sale at 12½ cents an acre at a time when the ways and means of raising a school-fund trouble the Legislature more than almost any subject except the State road. Heretofore the swamp has been sold several times to persons who were unable to carry out the terms of the grant, and heretofore there appears to have been little idea of the value of the land and little discussion, but now the question is being pretty thoroughly sifted, and the Georgia Legislature will be apt to get a consideration if they part with the property. They have been grimly reminded of the Legislature which in 1795 passed an act for the sale of 35,000,000 acres on or about the Yazoo River in Mississippi and the wrath of the people who rose up a few months later and hurled that Legislature from power. The proposed purchaser's agent uses the argument that private capital can do the work better than the State, but that does not command much attention in a State where the Capitol Commission has just completed within the original appropriation the best million-dollar house in America and a better one for the cost than any citizen of Georgia has ever erected. In 1898 the State will have 1,600 convicts on its hands at the expiration of the convict lease, and as the experience of the lessees has shown that this kind of labor can be maintained on better food than that of the average free labor for $145 to $150 a year, the State will be in a position to do the work cheaper than any corporation which has to pay a dollar a day for labor. — *New York Times.*

A PLUCKY FRENCH GIRL. — Some years ago four men, who were employed in cleansing a common sewer at a place called Noyon, in France, upon opening a drain were so affected by the fetid vapors that they were unable to ascend. The lateness of the hour (it was eleven o'clock at night) rendered it difficult to procure assistance, and the delay must have proved fatal had not a young girl, a servant in the family, with courage and humanity that would have done honor to the most elevated station, at the hazard of her own life attempted their deliverance. This generous girl, who was only seventeen years of age, was, at her own request, let down several times to the poor men by a rope. She was so fortunate as to save two of them pretty easily, but, in trying the cord which was let down to her for the purpose, she found her breath failing, and was in great danger of suffocation. In this dreadful situation she had the presence of mind to tie herself by the hair to the rope, and was thus drawn up, almost expiring, with the poor man in whose behalf she had so humanely exerted herself. The instant she recovered she insisted upon being let down again, but her exertions this time failed of success, for the fourth unfortunate man was drawn up dead. The corporation of the town of Noyon, as a small token of their approbation, presented the heroine with 600 livres and conferred on her the civic crown, with a medal engraved with the arms of the town, her name and a narrative of the action. The Duke of Orleans also sent her 500 livres and settled 200 yearly on her for life. — *Fire and Water.*

CHINESE FLOATING GARDENS. — In a recent number of the *China Review*, Dr. Macgowan describes the manner in which floating fields and gardens are formed in China. In the month of April a bamboo raft 10 feet to 12 feet long and about half as broad is prepared. The poles are lashed together with interstices of an inch between each. Over this a layer of straw an inch thick is spread, and then a coating two inches thick of adhesive mud taken from the bottom of a canal or pond, which receives the seed. The raft is moored to the bank in still water, and requires no further attention. The straw soon gives way and the soil also, the roots drawing support from the water alone. In about twenty days the raft becomes covered with the creeper (*ipomœa reptans*), and its stems and roots are gathered for cooking. In autumn its small white petals and yellow stamens, nestling among the round leaves, present a very pretty appearance. In some places marshy land is profitably cultivated in this manner. Besides these floating vegetable gardens there are also floating rice fields. Upon rafts constructed as above, weeds and adherent mud were placed as a flooring, and when the rice shoots were ready for transplanting they were placed in the floating soil, which being adhesive and held in place by weed roots, the plants were maintained in position throughout the season. The rice thus planted ripened in from 60 to 70 in place of 100 days. The rafts are cabled to the shore, floating on lakes, pools or sluggish streams. These floating fields served to avert famines, whether by drought or flood. When other fields were submerged and their crops sodden or rotten, these floated and flourished, and when a drought prevailed they subsided with the falling water, and while the soil around was arid advanced to maturity. Agricultural treatises contain plates representing rows of extensive rice fields moored to sturdy trees on the banks of rivers or lakes which existed formerly in the lacustrine regions of the Lower Yangtse and Yellow Rivers. — *London Times.*

STEEL BUILDINGS. — A very favorable account is given in the French papers of the new system of building houses of steel plates, introduced some time ago by M. Danly, manager of the Société des Forges de Chateleneau, who has satisfactorily ascertained that corrugated sheets, of no more than a millimetre in thickness, are sufficiently strong for building houses several stories high, and the material used allows of quite a variety of architectural ornamentation. The plates thus employed are of the finest quality, and, as they are galvanized after they have been cut to the sizes and shapes required, no portion is left exposed to the atmosphere. It is asserted that houses constructed in this manner are very sanitary, and that the necessary ventilating and heating arrangements can readily be carried out. — *Iron Trade Review.*

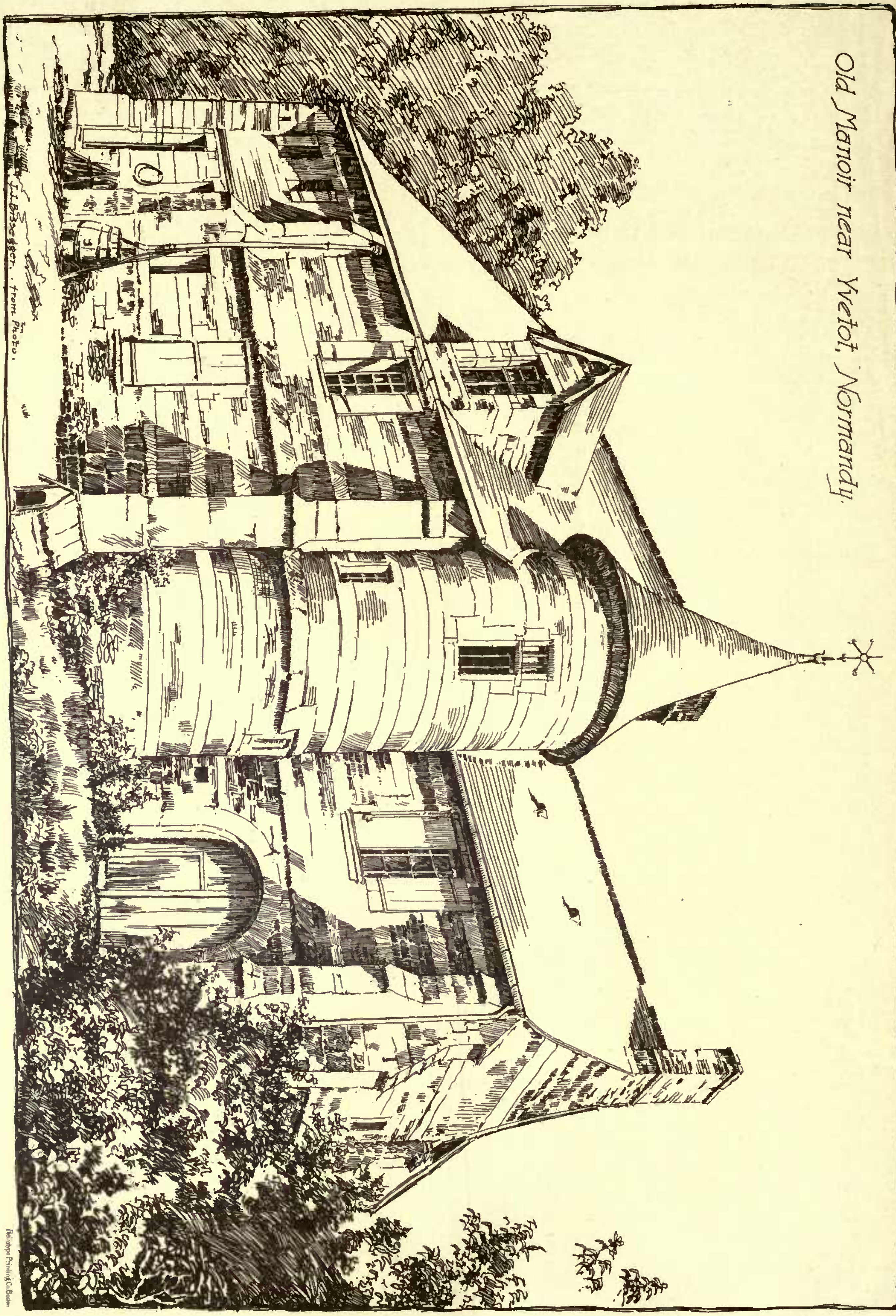
A STEEL CHURCH. — A church made of cast Bessemer steel has just been constructed by an iron-works at Hennegau in Germany. Its destination is the island of Manilla, where frequent earthquakes render a brick building unsafe. The weight of this steel church is 1,600 tons, and it will, it is thought, from calculations made, be capable of resisting earthquakes of a very severe nature. — *London World.*

TRADE SURVEYS

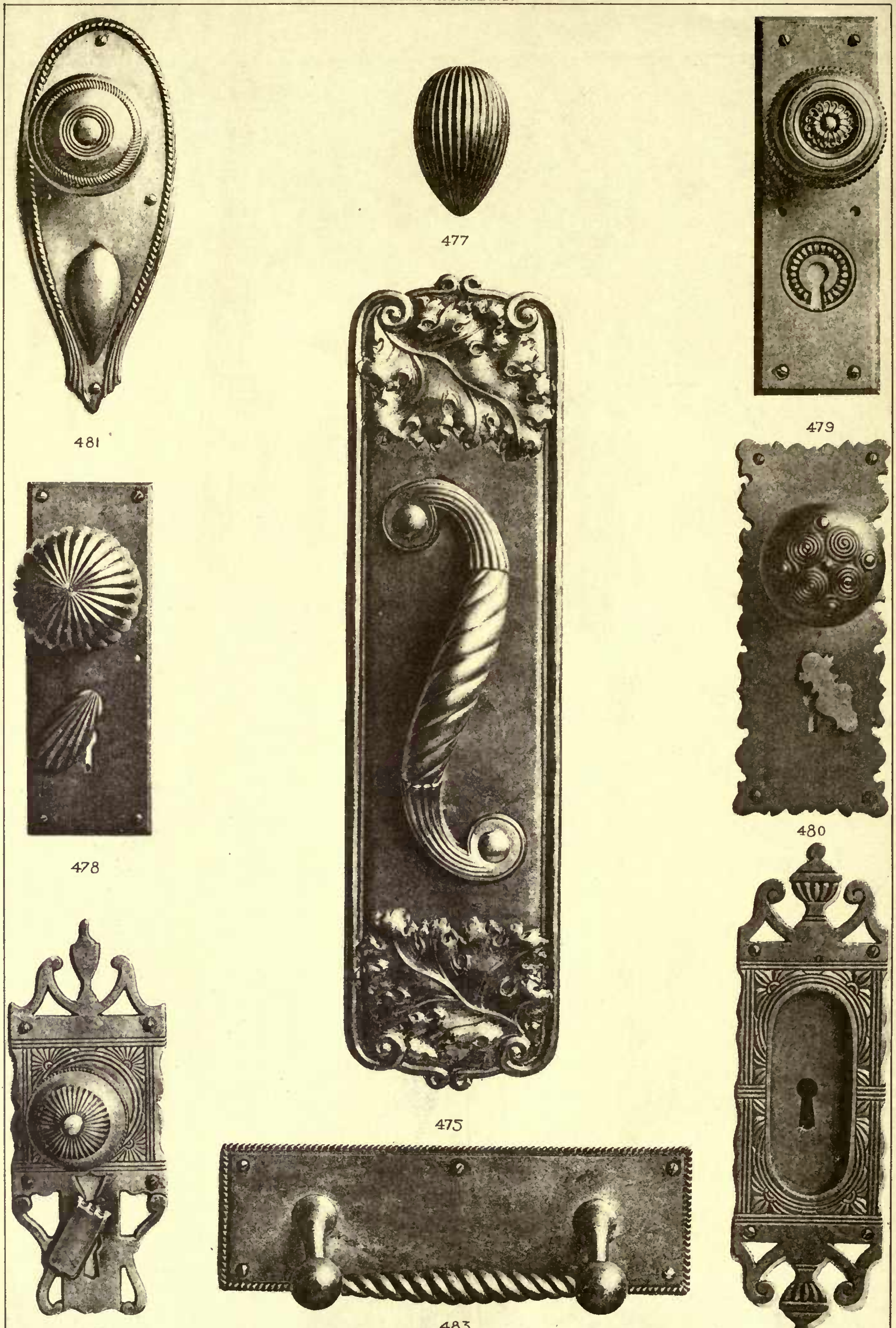
ALL of the recently published commercial and trade statistics emphasize the advisability of foresight in maintaining a safe and elastic financial system for the future. The bank reserves are nineteen million dollars less than a year ago, but this simply means that the greater general activity calls for more money. Should still greater activity overtake us next year, as is probable, with only seven millions surplus in New York banks, the necessity of some different method of relieving possible financial stringency than the paternal one in vogue will suggest itself. Last year's currency supply during September was $60,000,000, besides gold coin. So urgent was the demand for money, that after this vast amount had been injected into trade channels, the clearing-house banks at New York had only between thirteen and fourteen million dollars. The business requirements this year are and will be much heavier. All crops are larger, building operations are more extended, investments are more general, and the necessity for currency is greater. Are our sources of supply sufficient? Our admirable commercial methods can assist us in checking unfavorable symptoms, but whatever causes are at work to cripple trade, if there are any, will in time reach the surface, and to the surprise of the tens and hundreds of thousands of producers and exchanges. For the first time within recollection, extremely favorable industrial and commercial conditions exist on both sides of the water. It is barely possible that much of the labor discontent that has shown itself on our side during the past three years will show itself abroad. The conditions are ripening for it. Wages are low, hours long. A sort of military authority is maintained over workmen in some respects, and grievances are not and cannot be speedily righted. Manufactures are expanding, the habits of the common people are improving, and they are becoming animated with a desire to earn more, work less and improve their social conditions somewhere near what they dimly understand exists on this side. The long-standing advantage of British and European manufacturers over American manufacturers will from this out steadily but, perhaps, very slowly decline. A general movement for higher wages is in progress throughout Central Europe. For example, in Brunn, Austria, 14,000 out of 15,000 wage-workers engaged in the seventy cotton and woolen mills of that place struck against the present rate of wages, which are, for men, the miserable pittance of six florins per week, and, for women, two florins. The causes of these industrial agitations are threefold: due first, to an advancing intellectuality among the common people, to the better margins employers have been making, and to the increased cost of living consequent upon the gradual diversification of employments. On the other hand, immigration, machinery and the general decline in the cost of production and exchange of products is lessening the general cost on this side, and thus tending gradually to equalize conditions at home and abroad. The practical outcome may be that economic forces will harmonize conflicting interests on both sides of the water. Labor agitations abroad will not merely result in better wages, but in better habits of living and greater interest in what the governing classes are doing.

The only thought at present among both governing and employing classes is to put them down as quickly and quietly as possible, and give no further earnest thought to the workers or their grievances or aspirations. Herein they err. The deep popular discontent is the factor or the pivot around which grand and healthful realizations are possible. All business conditions point to greater activity. Last week's observations on industrial conditions apply with greater force. Production is being stimulated. Prices are strong. Distributions keep warehouses half empty. Jobbers are anxious, and manufacturers are putting-on hands and piling-up raw material. Builders have all they can do, and manufacturers of material have long contracts. The brick-makers in the flooded districts, as well as the lumber interests, have met with serious losses. Manufacturers of paper-fixtures, decorations and inside products for houses and buildings have a full season's work on hand. The little industries are thriving, and this is a hopeful sign. July railroad earnings show an increase of 8 1-3 per cent, and for seven months a fair increase is shown. Cereals and meat products exhibit great increases. The cotton crop is 300,000 bales ahead of last year. A favorable fact is shown in last week's Eastern freight shipments from Chicago, which netted 58,524 tons, against 40,318 tons for same week last year. No cause of any magnitude has appeared on the surface to warrant a general restriction of work, or to do less work next year than has been done this year. Ship and boat building is helping greatly in the iron industry. Railroad-builders affect to see excellent prospects for great railroad-building next year. The makers of heavy and light merchant steel will advance prices in a few days to profit by the great expansion in demand. Anthracite coal was advanced this week at New York. Advances seem to be the order of the day, and the grounds for making them are safe. The abundance of capital is another important fact, but capital is easily frightened, and a multitude of partially-finished enterprises might be prejudiced by a sudden withdrawal of promoters and subscribers. All these things have to be kept in mind, but the closest study possible fails to show that there is more than a very trifling percentage of risk in pushing new schemes and enterprises. Short crops would do great harm, but the experience of years shows that no general short crop is probable. For two or three years past, Texas and some portions of Kansas, Arkansas and New Mexico have suffered severely, but a smiling season has restored faith and hope. The newer sections are steadily making fresh markets for Eastern manufactured products, and the demand will of necessity rapidly grow.

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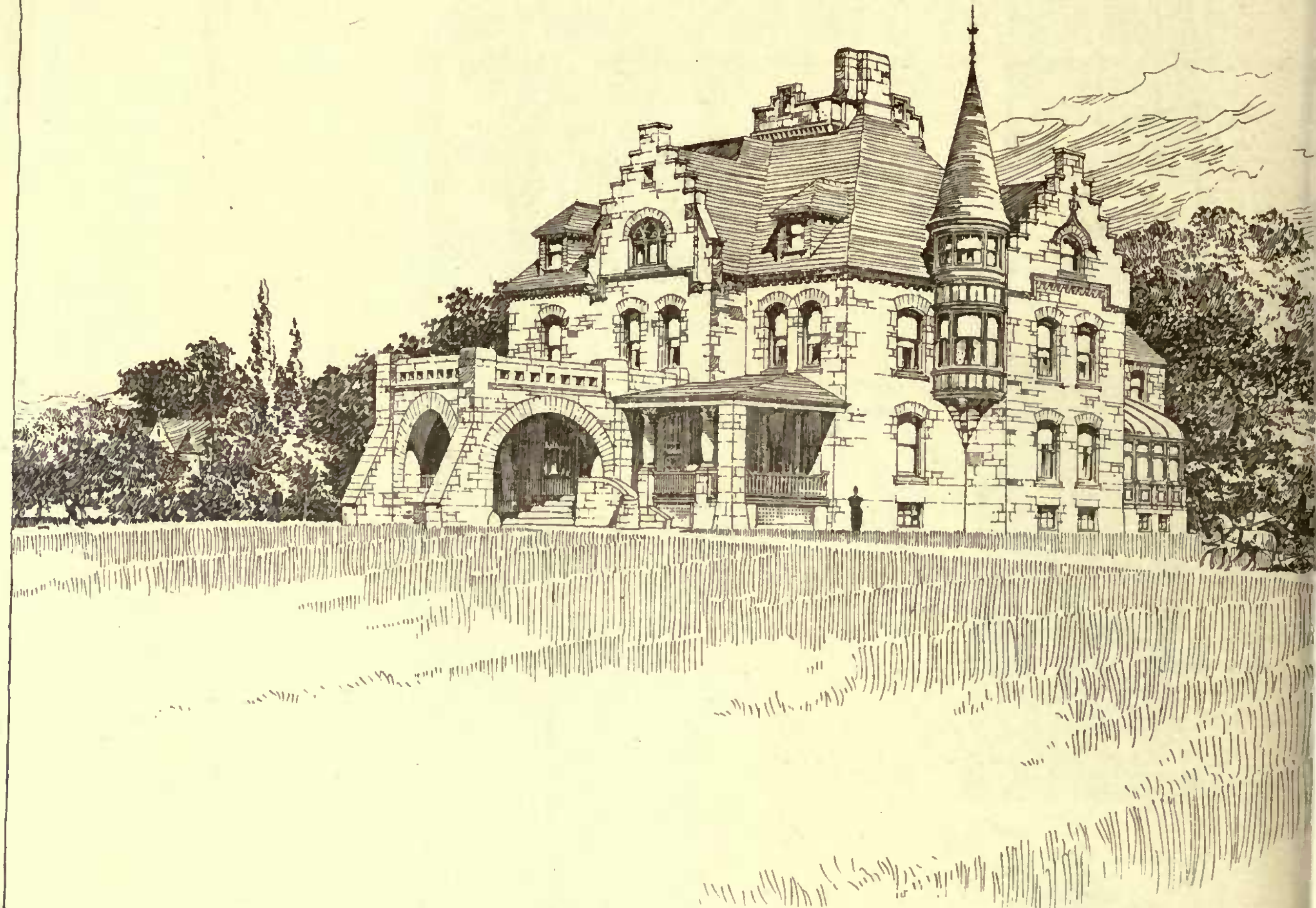


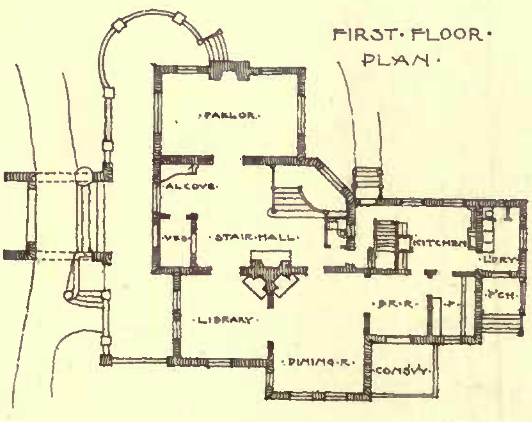
Old Manoir near Yvetot, Normandy.



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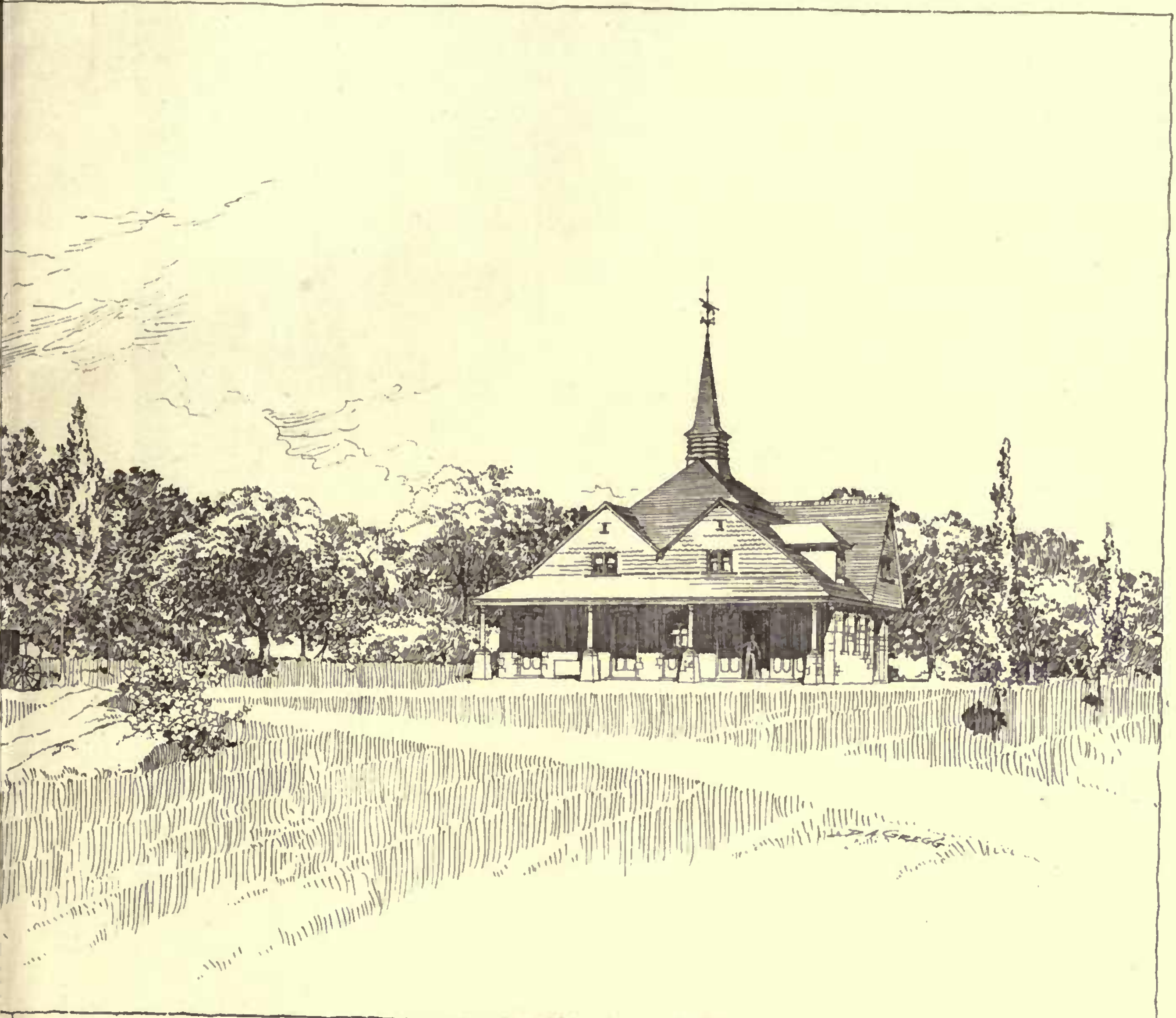
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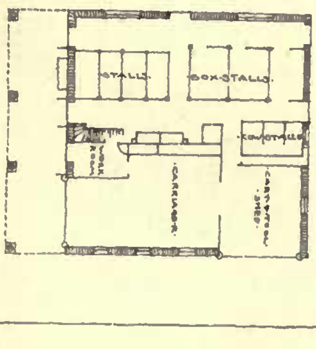
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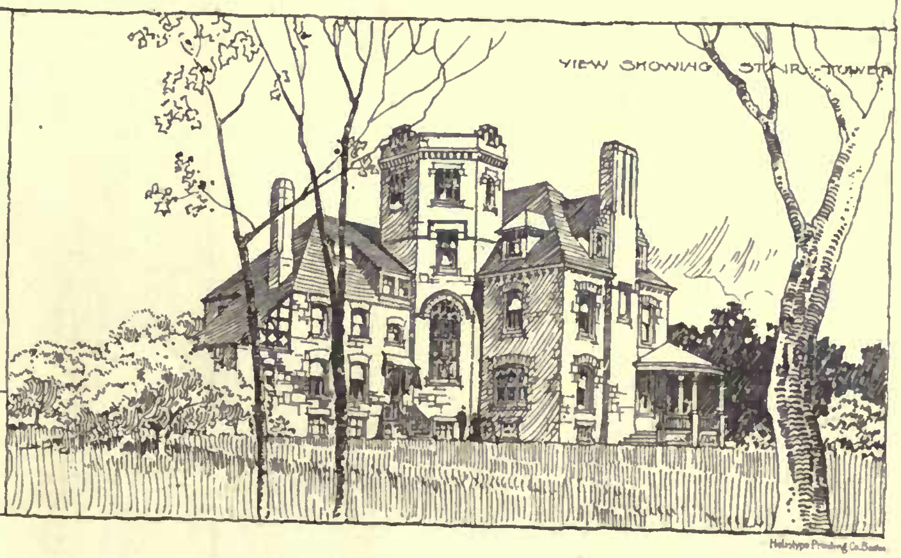
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A Tomb for an Illustrious Architect



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MADISON AVENUE METHODIST EPISCOPAL CHURCH, NEW YORK.

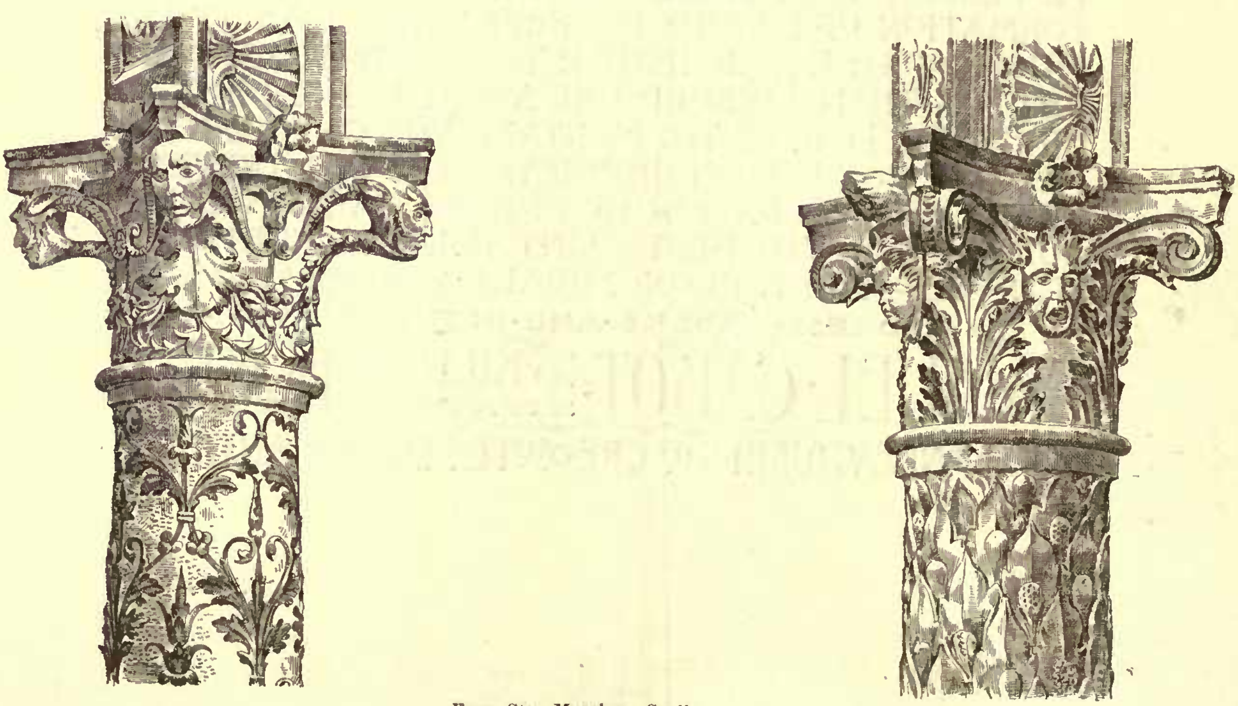
R. H. ROBERTSON, Architect.



From the Ducal Palace, Urbino.



From the Baths of Caracalla, Rome.



From Sta. Maggiore, Spello.

ITALIAN RENAISSANCE CAPITALS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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AUGUST 24, 1889.

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WE are getting used to finding American devices praised abroad, where Americanisms are at present much in fashion, but it is rather startling sometimes to see the sort of thing which is chosen for commendation. The last compliments of the kind that we have come across are devoted to the double-hung sash, which *La Semaine des Constructeurs* considers an admirable contrivance, which the Americans have brought to the highest perfection. It says that it was once used in France, but, as constructed there, it had so many faults that it went out of use, and is now practically unknown, while in the United States it has been constantly improved, until now it is employed to the exclusion of all others. We think an American could still point out a few defects in the double-hung windows of his native land, the principal one being, perhaps, their incurable ugliness of effect, while a good deal might be said about their indisposition to open in the dog-days, the frailness of constitution which often causes them to come apart before they can be persuaded to move, and the tendency of weights and lines to get tangled, stretched and broken. There is no doubt that our double-hung sashes take up less room when open than the French casements, are more easily set so as to ventilate without causing draughts, and are far tighter against rain, but to the eyes of our architects the French window-frames and casements of solid oak, or still more the iron ones of England, which he sees as serviceable as ever after two or three hundred years of constant use, have a charm which the frail concoctions of seven-eighths boards and cotton strings of his native land do not always possess. In the eternal warfare of the beautiful and the practical, wherein the architect plays the part of the mediator, who gets all the blows from both sides, no more ferocious battles are fought than in the department of windows. The genius who can make double-hung sashes and outside blinds look homelike and picturesque has yet to be born, and American architects, whenever they have a dwelling-house to design, know perfectly well that they must choose between making a charming sketch, with grouped and mullioned windows, in the English manner, for which they will be denounced by all their client's practical friends, as ignorant of the first principles of the easy sliding of sashes, and the correct arrangement of blinds; or laying out their openings of the same size and at equal intervals, and gaining thereby the commendation of the practical men, but the scorn of the people who "cannot see why modern architects should be so incapable of securing the picturesque effects of old work," and so on.

THE foreign papers have a great deal to say about the recent international Convention of architects in Paris. M. Guichard of Lyons, writes about the matter which was presented in behalf of the architects of Southern France in particular; proposing that the Convention should express itself in favor of making the possession of a diploma, or similar authoritative certificate of skill and attainments, indispensable to the practice of the profession of architecture. It will be remembered that a resolution to that effect, after the reading of an admirable paper on the subject, was offered in the Convention, and decently, but expeditiously shelved by referring it to the next international Convention, greatly to the disgust, as it appears, of M. Guichard, who says, with a great deal of reason, that the proceedings of this august convocation of the magnates of the profession reminded him of a consultation of great physicans over a patient, in which professional etiquette required so many mutual congratulations, and observations on the dignity of science, that the patient died before the salutations were concluded. It seemed to him that a great deal was done to call attention to the nobleness of the art of architecture, which could exist perfectly well without being advertised, while the real patient, the collective practitioner of that art, a patient, too, whose case is well-nigh desperate, was serenely ignored by the Convention from beginning to end. M. Guichard asks earnestly whether this is always to be the attitude of conventions of architects in future, as, according to his observation, it always has been in the past. While the architects are rhapsodizing over the higher flights of art, and discussing with zeal the question whether the study of antique or mediæval architecture gives the best preparation for them, the members of other professions are looking out, not for medicine or the law, but for the lawyers and the doctors. The architects have such an excellent reputation for not knowing how to take care of themselves that, as M. Guichard says, they are a prey to all sorts of intrusion and trickery. While teachers, druggists, doctors, attorneys and we might add, in this country, plumbers and steam-engineers, are obliged to have a certificate of competency before they can practise their calling, any one who wishes to call himself an architect can attach himself like a parasite to a skilled and honorable profession, living upon the credit which better men, with infinite study and pains, have gained for the name which he so coolly appropriates, and returning thanks for the benefits which he derives from it, by injuring through his deficiency in the rudiments of the knowledge attaching to it, every one who has the misfortune to bear it with him.

WE know well enough in this country what M. Guichard means, and, although local associations of architects are occasionally driven into making a stand for professional rights, it is nearly as true with us as it is in France, that a few platitudes about the ethics of practice, a little lamentation about the evils of the cruel farce called competition in this country, and some discussions upon drainage, constitute the sum total of the work accomplished by the general conventions. In the interval between the conventions, nothing whatever is done by the body that can do it best to correct the evils complained of, and the following year only brings with it a fresh patch of indignities to be mourned over, and then forgotten. Architects, of course, see all this, and regret that nothing can be done as the profession is not sufficiently well organized to protect itself as does the professions of law and medicine, but its imperfect organization is the very thing that exposes it to the injury inflicted upon it by parasites whom it is too feeble to get rid of, and by tricksters whom it has not resolution enough to bring to justice. With us it cannot be said the profession is, as M. Guichard says it is in France, every day falling lower and lower in the public esteem, for our local associations have done much to improve the standing of their members, but it is still true here, as there, that the profession which, with the exception, perhaps, of that of medicine is carried on with the highest integrity and disinterestedness, is the most exposed of any as he says, to the sucking and nibbling and biting of every kind of parasite, and one cannot help sympathizing with him when he says, "For heaven's sake, let us learn how to do some biting in our turn!"

THE trial of Mrs. Maybrick in England has given new importance to the question, which has already been a good deal discussed, whether a change could not with advantage be made in the system in use at present in this country and England, for procuring the testimony of experts on points about which only an expert can give testimony of any value.

Under the existing system, a man who happens to be engaged in a suit concerning technical matters is obliged, if he would have the jury pay any attention to his case, to employ a greater or less number of expert witnesses. As these are employed exclusively to help him, his lawyer, before the trial discusses the matter with them, hears their opinions, modifies, softens and directs what they will have to say in such a manner as to give it the appearance most favorable to his side. The opposing party, meanwhile, has his own experts in training, under a lawyer bent upon getting them to give testimony exactly contrary to that produced by the other side, and if the experts, as is often the case, happen to be rivals in professional reputation, the string of jealousy is cleverly pulled by both lawyers to heighten the disposition of their own men to contradict what is said on the opposing side. In trials like Mrs. Maybrick's, where the technical points involved are matters of medical science, concerning which opinions and experience differ infinitely, the expert evidence brought forward by each side might be expected to consist mainly in contradictions of that adduced by the other, but even in matters of engineering and architecture the case is nearly as bad, for whenever a question involves professional opinion, as do most of those which come before the courts, a great variety of opinions is at the service of those who know how to look for the kind they want.

THE consequence is that juries, finding that the persons brought to instruct them in technical matters disagree on nearly every point, pay little attention to the expert testimony, while the litigants on each side spend a great deal of money in employing expensive witnesses, the net results of whose evidence is *nil*, as the testimony of each set neutralizes that of the other; and many lawyers, as well as others, now strongly favor the introduction, at least into this country, of the French system, under which experts are appointed by the court to investigate technical matters, and render an opinion, which usually forms the basis of the decision. As neither party has any opportunity for influencing the expert, his opinion is usually fair and reasonable, and his charge, which is fixed by law, is paid by the defeated party to the suit. The advantage, so far, at least, as architects are concerned, of such an arrangement is well shown in a case decided in June by the Tribunal of the Seine. A certain architect, M. Douillet, built two houses for a lady of rank, Madame de la Vernède, one in Paris, and the other on the Mediterranean coast. When he sent his bill, he was met for the first time by the usual complaints. The houses were inconvenient, it appeared, and badly built, all through his fault. Moreover, the Paris house was intended to cost forty thousand dollars and really cost seventy thousand, also through the fault of the architect, who ought to pay the difference out of his own pocket; and in any case a charge of five per cent on the cost was unreasonable; so that instead of Madame owing the architect anything, he owed her a large sum. Instead of spending months in hearing witnesses contradict each other on all these points, the court appointed experts to look over the houses, and see whether the architect's work in them had been badly done. They reported promptly that it had not been badly done; that the construction was proper and that the inconveniences complained of resulted partly from the small size of the lot, and partly from carrying out arrangements ordered or consented to by Madame or her son. In regard to the excess of cost over the limit fixed, the court found that Madame de la Vernède had herself ordered the original plans to be modified, asking for richer decoration and greater height, so that the architect was no longer bound by the original limit, even if he had originally been so; and in regard to the commission charged, it said that five per cent on the cost was the customary fee to architects for their services. Madame de la Vernède's claim, that the excessive cost of her Paris house was caused in great part by the "fraud and dishonesty" of the architect in the settlement of the accounts appears to have been dismissed by the court with silent contempt, as there is no special mention of it in the decree, but, on the contrary, a rule was laid down of considerable interest to architects, to the effect that an architect's commission is to be calculated on the fair amount of the bills, not on the sums actually paid the mechanics in settlement. In the present case, Madame de la Vernède, who appears to have been a remarkably business-like person, had bullied the contractors into making discounts from their bills, as the court said, "for the sake of avoiding legal proceedings, and getting their money without further delay," but the decision says that these transactions are, so far as regards the architect "*res inter alias acta*," which do not diminish the architect's care and trouble, and ought not to diminish his compensation; and in accordance with this view, it ordered judgment for M. Douillet for five per cent on the total amount of all the bills and contracts, with interest, and condemned Madame de la Vernède to pay all the expenses of the suit, including the experts' fees.

THE Paris, Lyons and Mediterranean Railway has recently put on its line a number of first-class passenger cars, modelled on a pattern which partakes both of the American and the European systems, and combines some of the advantages of both. It must be acknowledged that travelling in a compartment of a first-class car abroad, particularly when the traveller, as often happens, has the compartment all to himself, is very pleasant, much pleasanter, to our mind, than riding in the most gorgeous Pullman car. In such a compartment there is space enough for two or three people to move about comfortably, which is not the case in the private rooms of a Pullman car, the only places where privacy can be enjoyed in American railway travelling; and the occupants can change from side to side, according to the view they wish to get; while there is no annoyance from the restless passengers, conductors, water and newspaper boys, peddlers, expressmen and so on, who tramp unceasingly up and down the aisles of our drawing-room cars. At the same time, there is a certain inconvenience, and even danger, in being unable to escape from the compartment without the help of the guard outside, and a certain liberty in passing through the cars from one end of the train to the other is often desirable, both for officials and passengers. With this idea, the Paris, Lyons and Mediterranean road has constructed two types of cars, in which there is a passage from one end to the other, unobstructed, except by doors, and having the entrances, as with us, from platforms at either end. Once in the car of what is called Type 2, the traveller finds himself walking through a passage placed, not in the middle, as in our cars, but near one side, so as to give room for two seats on one side, and one on the other. The benches are arranged in pairs, facing each other, and as the width of the car comprises only three seats besides the aisle, instead of four, as is usual with us, and in the Swiss cars, the places are very spacious. Our traditions would hardly admit of making half the passengers in the car ride backward, and it is not always pleasant to be compelled to sit facing one's travelling companions, but it must be remembered that in Europe the seats with the back toward the engine are considered the best, as being less dusty than the others, and with one's own party the group of four seats facing each other, and cut off by the high backs from the adjoining groups, is very agreeable, so that the advantages are pretty equally balanced. Two of the four-seat groups at each end are enclosed by partitions and doors, but the others are open to the aisle, as are also all the pairs of single seats on the other side of the aisle. These single seats, to our fancy, form the best feature in the new car. In a car so fitted a single traveller can have a seat by himself, much more comfortably arranged than the chairs in our Pullman cars, while parties of two, or four, or six, can have places together, sufficiently separated from the rest of the company, but not entirely isolated, and all the travellers can enjoy the American comfort of lavatories, which are provided at each end of the car.

IN the other pattern, the Type 3, the compartments follow the old rule, each containing six places, three of which face the other three; but the car is wide enough to give an aisle alongside the compartments, something as in our boudoir cars. In order to balance the weight, half the compartments are placed on one side, and half on the other, the aisle forming a double elbow in the middle of its length, but as all the compartments have doors, the direct view from them is confined to one side of the train, and, except for the advantage of the passage through the car, and the lavatories, the arrangement is hardly better than the old one, and is much less pleasing than that of Type 2. According to *Le Génie Civil*, the arrangements for lighting the cars at night are nearly, or quite, equal to ours, a gas-burner, on the Pintsch system, by which gas is carried, compressed in cylinders, in the cars, being placed in each compartment; the cars are warmed by hot water, from a boiler at each end, which is enclosed in a closet opening only on the platform, and shutters, or rather cushions, stuffed and tufted, are provided to cover the windows with in extremely cold nights.



THE ART INSTITUTE. — POOR WORK OF THE PUPILS. — MUTUAL ADMIRATION AMONGST CHICAGO ARTISTS. — ANNEXATION OF THE SUBURBS.— THE SEWERAGE QUESTION. — THE WATER-SUPPLY. — LAW SUITS.

According to the annual report of the Trustees of the Art Institute, just issued, that institution is in a very flourishing condition. Owing to the rapid increase of membership, which now numbers nearly two thousand, it is financially much better situated than a year ago; a considerable number of pictures have recently been purchased, and the space occupied by the Institute is soon to be materially increased. All of which is a subject of congratulation; but there are some points, not mentioned upon which there is not so much chance for glorification.

A short time since the second annual exhibition of American oil-paintings was brought to a close and although visited by large numbers of people, the pictures did not permit of a particularly favorable comparison with the exhibit of last year, which was, as mentioned in these letters, extremely good. It seemed as if this year the best work had already been picked out in the East, since many notable names were entirely absent, while the remainder had been shipped out here as quite good enough for Western needs.

At the time of this exhibit there was also displayed in the other room the works of the pupils of the Institute for the last year, and if the oil-paintings were disappointing, this work was even more so. Some of the studies of flowers in water-colors were extremely good, but the work done from the cast and from the nude was (if one may be permitted to express his honest opinion) simply atrocious for a school of this character. Movement, feeling and proportion had been perfectly obliterated in a struggle after a hard and stippled finish. Within the past few years the whole system of instruction appears to have been changed, and instead of seeking after proportion and movement, quickly but accurately jotted down in a thoroughly artistic manner with charcoal and stump, the whole idea seems rather to stipple over and over again some drawing, the outline of which need only in a general way be like the model. Indeed, at least one of the instructors is credited with urging pupils to spend an entire day finishing up two square inches! As a natural result, in the struggle after an unimportant and almost mechanical detail, the scholars have lost all the finer points of the original conception, and are slow, inaccurate and inartistic workers. It seems curious that some of the Chicago artists do not make themselves heard about this work, but probably no particular attention would be paid to them even if they should; for, although Chicago esteems it a solemn and sacred duty to extol to the skies nearly everything, good, bad and indifferent indiscriminately, that belongs to itself, one especial exception is made of the artists. Their work receives but half-hearted attention until their studios have been moved to New York or Paris. Quite naturally, lacking any other encouragement, those who stay here seem to form themselves into a close-corporation mutual-admiration society, as it were, and pay but little attention to anybody or anything but themselves. This is unfortunate for the community, and especially so for the artists, since there are some very able but, most of them, extremely modest men, who should amount to something, and there are others who, with a little proper and intelligent criticism — not from the mutual-admiration society — might be induced either to do some good work or else go into some of the less artistic but lower branches of sign-painting. Consequently, but little outcry, if any, can be expected from the Chicago artists relative to the work exhibited at the Institute, for they would, of course, have to praise the work if done under the direction of one of their members. As for the newspaper critics who really stir things up, few, if any, have ever received any practical or working art-instruction outside of the United States. Some of their articles are written upon the basis of what they have read (and several of them are extremely well posted), but more generally such articles are manufactured with the assistance of some one who they think should know. Hence, if the teachers tell them the work of the Institute is good, that settles it, especially if the drawings look smooth and nice.

By a recent vote of several suburbs, the city of Chicago has been considerably augmented in population and greatly increased in geographical area, so that it now boasts of covering more square miles than any other city in the world. So far as fire-limits and building-ordinances are concerned this addition will make no particular difference, as it seems to be understood that for the present, at least, the fire-limits will be very little, if at all, changed.

But in connection with the sewer and water systems some very great improvements will probably be made, and these are even now under consideration, but the question of the sewerage for so very many square miles is a matter of such importance and magnitude, and necessitates the outlay of such a vast sum of money that it will probably be some time before the question will be entirely decided. One system is now being discussed quite seriously, and several others have been broached. On one point, however, they all agree, and that is that all the sewerage will be discharged not into but away from the lake, since by a recent act of the legislature it is permitted to utilize certain canals and streams for this purpose, and so eventually everything will be carried into the Illinois and thence into the Mississippi River. This or some method entirely different from the one now employed was, even before this enlargement of the city, an imperative necessity. The lake at certain seasons of the year becomes so polluted that there is great complaint about the drinking-water, which is now taken from a point nearly two miles from shore. Also, the supply of water is not equal to the demand; but that was so evident several years ago that for nearly twenty months past work has been in progress for a new supply farther towards the south of the city. This supply, at the rate of one hundred million gallons per day, is to be taken at a distance of four miles from shore. The tunnels underneath the city for this system, which are about two miles in length, are now completed to the new pumping-works, one on the west, and one on the south side, so that nothing more remains but the portion under the lake, which will, however, probably take nearly a year and a half to complete. This tunnelling underneath the city, although about 70 to 75 feet below grade, has required the greatest care, since our soil is nothing but sand and clay. In several instances the work has been turned either to one side or to the other to avoid heavy buildings, and at one time there was considerable newspaper talk about settlement and, indeed, one or two buildings were probably a little disturbed, but very few people had any idea that the tunnel was being dug beneath them. The question, however, that may be not unlikely to arise in the future is that of putting extremely heavy buildings on top of this tunnel, and, unfortunately, it runs some little distance through a district that bids fair to be heavily built upon during the next twenty years. The diameter of this tunnel is eight feet, and the brick walls are only thirteen inches thick, which at first sight would certainly appear thin; however, rough guessing is not engineering.

Suddenly there appears to be a spasm of law-suits in the courts, in which architects figure more or less. One case recently decided seems unfortunate for the profession, inasmuch as it may establish a precedent in the courts for the rate of professional services as four instead of five per cent. The testimony of two architects (neither of them members of the Institute) was obtained to the effect that four per cent was the usual charge for services by first-class architects of Chicago for the class of work under consideration, while the testimony of the oldest and best-known architects in the city seems to have been unavailing to make any impression upon the court, which rendered a verdict for four per cent. In another case architects are being sued for damages, said to be due to improper workmanship and materials upon buildings put up so long ago that the case would have been outlawed in a few months more. And this in the face of the fact that the owner had employed them upon other buildings in the meantime, since he had been so well satisfied with their first work.

The agitation in the City Council regarding high buildings, mentioned in a previous letter, seems to be about over, and permits are now being issued for buildings of any number of stories desired, so that the question will probably not soon be raised again; and so the era of high buildings is now fully under way, with several designs upon the boards that call for sixteen stories.



THREE-AMERICAS EXHIBITION, ITS AIMS AND ENDS. — WASHINGTON THE ONLY SUITABLE PLACE FOR ITS LOCATION. — A PLEA FOR WASHINGTON AS THE HEADQUARTERS OF THE A. I. A.

The object of the exhibition is threefold: To commemorate and do honor to the name of Columbus on the Four Hundreth Anniversary of his discovery of America. To bind more firmly together North, South and Central America in friendship and amity, by contact, friendly intercourse and rivalry. To induce a more extended exchange of raw materials and manufactures between these countries which are bound to each other by the ties of one land, and which would be of material advantage to all.

All movements towards the formation of such an exhibition have been entirely local, their claims being supported only by their own indwellers with the one exception — Washington City — whose scheme is not only national but American, I might almost say world-wide.

Brooklyn, through Talmage; St. Louis and Chicago, through a committee of citizens; New York, through its stock exchange; Staten Island, through some of its newspapers have all made a bid to obtain this valuable prize. For, in whatsoever commercial or manufacturing city the exhibition is located, that city hopes and expects to forestall its sister cities in any commerce, consignments and trade

which will undoubtedly be the outcome of it. Washington, with no commerce, manufactures or trade, does not expect to outrun its fellow-cities in the race for gain, is endorsed with few exceptions by every city and State in the Union, by the eighteen American nations, and by Spain and Italy who are anxious to do honor to the name of Columbus.

All claimants for location have gracefully withdrawn their claim, except New York and Chicago. New York is professedly determined to win the prize. This large city has made many failures in efforts to accomplish even small things, when the monied-men did not see an investment with good, sure interest behind it. Are not the chances in favor of history repeating itself in this instance?

The Statue of Liberty pedestal, for money to build which they found it necessary to beg all over the country, and then were on the verge of failure. [By the way, this statue should have been placed in Washington, not in New York.] Grant, although adored, was loved less than the money which is not forthcoming to even commence his monument, and his very grave was used for the purpose of booming real-estate. If repeated at an international event, such squabbles as those between the mayor, the aldermen, the legislature and the committees during the late Centennial ceremonies in New York would be very mortifying to right-minded citizens of the United States and would create a bad and possibly a hurtful impression on our sister nations. At the time of the World's Exhibition in New Orleans, about three years ago, in New York there was great blowing of trumpets, meetings of citizens, appointment of committees, collection of money from railroad and hotel men (the only New Yorkers who apparently felt sure of a proper return), selection of a site and other things preliminary to a great world's fair. New York must and would have the fair! What was finally done? No site would do except Central Park. The people would not have Central Park destroyed even temporarily for such a purpose. Only some few hundred thousand dollars were raised, where as many millions were necessary. It would have been of advantage to the many in New York. The monied few were evidently aware that the personal return would not be sufficient to induce them to dip deeply enough into their pockets to carry the scheme through. The result all will remember, the exhibition was held in New Orleans. New York has topographical or geographical difficulties which I think she would be positively unable to surmount. The street and elevated roads are crowded—and even the hotels in many instances—with the ordinary population. How would it transport and lodge the large crowds who would necessarily attend the exhibition with no room within herself to expand? And where would New York hold it? That is a question over which they are now having a determined fight. In New York the exhibition would be almost necessarily a local affair, although possibly a big local affair. The South, West and East would not join, or at least would join with little zest or vim in helping New York to still further monopolize trade. All could join at Washington as on neutral ground belonging equally to every part of the country, with a feeling of certainty that any trade or commercial advantage that would accrue would be in proportion to the display each city or section should make. Richmond, Atlanta, New York Boston, Chicago, St. Louis, San Francisco, etc., would each receive its due proportion of advantage. The governments of the American nations would more readily endorse such an exhibition in Washington, the Capital city of the strongest one of these nations, than in any city, however large, which represented only a State or section of the United States.

Chicago not being on the seaboard, the cost of transportation thither of exhibits would be a sufficient bar to materially cripple the number and character of such exhibits.

The advantages of Washington are: First, that it is the Capital of the nation; secondly, it has permanent exhibits of no little importance.

Starting with the Capitol, the largest and most important building in the country, architecturally, historically, legislatively and judicially: here thoughtful people may study our great judges and legislators, in the Supreme Court and Houses of Congress. Some hundred yards to the east of the Capitol will probably be completed by that time the new Congressional Library, containing one of the largest libraries in the world and in itself to be, I believe, the largest library building. West, a short distance, are the Botanical Gardens. Two squares farther west still is the Fish Commission Building, where the methods of fish hatching, breeding and distributing can be seen with pleasure. Across the street, still going west, is the National Museum, full of interesting and valuable things, showing the history of man and his implements, utensils, arms and habits; also many finely mounted specimens. Adjoining the Museum on one side is the Smithsonian Institution, with similar interesting matter on exhibition, and on the other side is the Army Medical Museum, with the largest and best medical library in the world and many rare specimens, particularly rare, I believe, in the examples of gun-shot wounds. Nothing could be more interesting to the medical fraternity. Passing from the Smithsonian grounds, still in a westward direction, we go into those belonging to the Agricultural Department, where farmers and agriculturists and all interested in vegetables and domestic fowls can see many things to please them. Still going west, we pass into the Washington Monument grounds, to the Monument, up which an average of ten thousand people have gone monthly since it was opened to the public. The bird's-eye view of the city, the Potomac and the surrounding country well repays the visitor for the time and trouble needed for the ascent. It is the highest stone structure in the world, tall, simple and effective in its pure white outline against the green hills and the blue sky which form its background.

North of the Monument, within ten minutes easy walk, are the Treasury, through the vaults of which many people enjoy going and seeing millions of money; the White House, where every one can go and shake hands with the ruler of seventy million people (quite an inducement judging from the number who daily visit the White House); the War, State and Navy Department, a costly granite pile; the Museum of Hygiene adjoining the Navy Department containing many things of interest to sanitarians, having the largest library on such subjects, and quite a collection of heating, ventilating, plumbing and mortuary devices—the best collection in the country of the kind. West of the Monument is the National Observatory. Passing from the Monument grounds on the south, we go in a southeasterly direction into the park made by reclaiming the Potomac Flats, about seven hundred acres in all: this is a little smaller than Central Park in New York. It is in this park that the Board of Promotion proposes to locate the Three Americas Exhibition. When complete there will thus be formed a series of exhibition buildings from the Capitol to the end of the new buildings, covering an area of about one thousand three hundred acres. Other objects of interest in Washington not directly in the grand series of parks and buildings I would mention, but all easy of access, are the Patent Office, interesting to mechanics, manufacturers and inventors; the Navy Yard and its new ordnance foundry; and leaving the exhibition park in a northwesterly direction, driving through the finest section of the city and then along the picturesque valley of Rock Creek, or along Columbia Heights, built up with beautiful suburban dwellings, in a short drive of one-and-three-fourth miles, the new Zoological Park will be reached. The natural and picturesque qualities of this site are unsurpassed. The park will be the largest in the world devoted to such a purpose, and by 1892 will be in good running order. By that time it will have the largest collection of North, South and Central American animals in the world. Just the thing for the Three Americas Exhibition. They will have besides a large number of foreign animals. But the idea of the Zoo is to preserve the many American animals which are fast becoming extinct.

The drive may be continued from the Zoo across a truly beautiful country to the Soldiers' Home, a fine park with some sixteen miles of driveway.

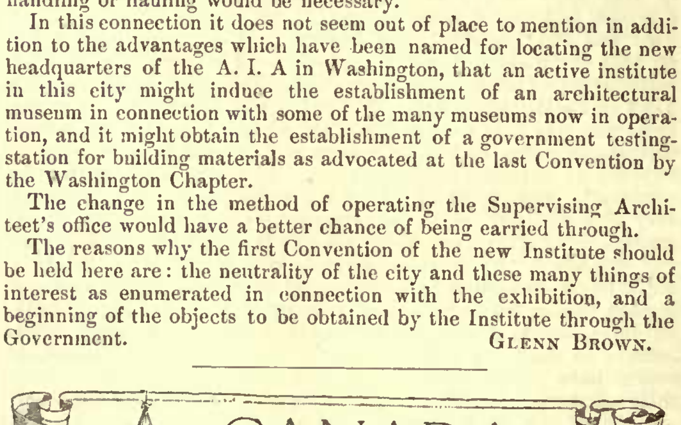
The intention of the Board is to have, at least, a part of the exhibition retained as a permanent one, displaying the products of the different States and nations, adding to the long series of interesting collections which already occupy the mall as enumerated above. This would be of permanent advantage and interest to our country. Washington has been well-drilled in the proper and best methods of managing large crowds, as exemplified by our inaugurals. Its railroad lines run to all parts of the country, and the Potomac furnishes opportunity for transportation by water from all parts of the world. The wharves would be on the exhibition grounds, and little re-handling or hauling would be necessary.

In this connection it does not seem out of place to mention in addition to the advantages which have been named for locating the new headquarters of the A. I. A in Washington, that an active institute in this city might induce the establishment of an architectural museum in connection with some of the many museums now in operation, and it might obtain the establishment of a government testing-station for building materials as advocated at the last Convention by the Washington Chapter.

The change in the method of operating the Supervising Architect's office would have a better chance of being carried through.

The reasons why the first Convention of the new Institute should be held here are: the neutrality of the city and these many things of interest as enumerated in connection with the exhibition, and a beginning of the objects to be obtained by the Institute through the Government.

GLENN BROWN.



SAULT STE. MARIE.—THE TORONTO MUNICIPAL BUILDING.—CANADIAN ARCHITECTURE AT THE PARIS EXHIBITION.—COMMISSIONS OFFERED BY CONTRACTORS.

THERE is nothing particularly novel nowadays in the sudden birth of a new city or its development by such rapid strides as used to take away the breath of Europeans and cause them to look on in unmitigated astonishment. Americans as a nation, are essentially *moral engineers* according to an old definition of engineers and architects. It has been said that the difference between an architect and an engineer is this: if an architect were to be asked about the execution of a certain building scheme he would say "I will see how it can be done," whereas an engineer would say

"I will do it." The architect takes into consideration the obstacles in the way, while the engineer makes no account of them at all but by hook or by crook will surmount them. So with Americans, if there is cause or occasion to build a city, they do it without hesitation and this spirit is gradually pervading other nationalities, notably those that come in contact with that enterprising people. But although the practice until revived by Americans has been in abeyance for 2500 years, it was a common practice among the ancient nations and tribes, chiefly, I suppose, because there being few cities, increase of population or division among the people made it necessary to provide places of residence; so that one often reads of people setting out to "build a city" — one man is often mentioned as the "builder of a city" — ever since the days of Urukh some 2000 years B. C., or nearly 4000 years ago. Well, then, like Urukh of old and like Americans of to-day, Canadians have set out to build a city and the Canadian Sault Ste. Marie is rapidly becoming a thriving commercial town. Its population already numbers 4,000 souls although on approaching the place by water it does not present as yet so flourishing an appearance. Besides the private residences for the accommodation of the inhabitants there is an immense hotel of 215 rooms, capable of holding 400 guests at least. The city is being lighted with electric light by the Heisler Incandescent Company. That which has made the city has naturally been the ship-canal and that which has made the canal has been the natural streams and rivulets that run through the well-wooded spot. The canal has been grandiosely compared to the Suez Canal on account of the number of vessels that pass through it, being equal to the number *per diem* that pass through the Suez; but though the "Sault" Canal is a very fine one the two canals stand in the same proportion one to the other as the vessels that pass through them. It is interesting, however, to find that this is not the first canal at the place, traces of an old one having recently been discovered, and it has been proved that it was the property of the Hudson Bay Company and used by them for their fur-trading sloops. Their old fort stood on the grounds now occupied by the Electric-Light Company's works. American troops destroyed it in 1812, but although rebuilt subsequently, it gradually fell into decay and ruin, as it was no longer necessary for the protection of the Company's interests.

Of all the cities of Canada certainly Toronto is the one to which all architects and engineers must look with most interest: sometimes it is the architects whose special interest is excited, at others it is the engineers. Hardly a week goes by but some new scheme is promulgated, buildings or railways, canals, or something of the kind, and new industry after new industry starts up to meet the demand occasioned by new works. Millions are being spent on new buildings, for public and private concerns. It is proposed to spend millions upon railway facilities and millions have been voted for the general improvement of the city and its suburbs, in the way of parks and recreation-grounds.

A struggle has been going on over the appointment of a paid commission to superintend the construction of the new Municipal Buildings, Toronto. In the wording of the by-law upon which $600,000 more were voted by the freeholders towards the cost of the building was a clause which most people appear to have understood to mean that a paid commission would be appointed to superintend the work. It appears, however, that the clause meant that the corporation might have power to employ a paid commission. This, however, was not discovered until some worthy citizens had obtained or endeavored to obtain an injunction against proceeding with the works until the commission was appointed. It was estimated that a paid commissioner would cost the city several thousand dollars, and this money could not legally be drawn from the amount appropriated for the building. A vote was therefore taken on the subject but only a small number of citizens, freeholders of course, took the opportunity of expressing their opinion and the commission was knocked on the head, by the votes of those who were against it, who, of course, took care to record their votes. The *Canadian Architect and Builder*, points out that this is to be regretted as the work is now in the hands of a committee of aldermen, whose power endures but a twelvemonth and who, with one or two exceptions, perhaps, are without the experience necessary. "Pity the poor architect!" The sympathies of the profession are requested for him. Pulled this way by grocers, brow-beaten there by candlestick-makers, will there be anything left of him when the building is completed, if it ever is, which under these circumstances I think is rather doubtful. The judge, in deciding that the injunction already alluded to should not issue, remarked that conduct of the Council had been so discreditable that their costs ought to be refused. It augurs well for the proper execution of a building to cost a million and a third of dollars!

Canada with all its progress, with all its millions, is according to the "press," represented at the Paris Exhibition by an "Indian wigwam," and one paper jocosely remarks that it is to be hoped Parisians will not attribute to us a simplicity of architectural style to which we do not really aspire. It would be interesting to know whether there are any specimens of the present generation of highly cultivated human beings represented as oysters. It is perhaps cynically characteristic of the French, who are not a colonizing people, or successful in their colonies as a rule, to suppose that since they lost possession of Canada the country should have retrograded rather than advanced. A wigwam was probably the last thing the Frenchman saw before he signed the treaty of the cession of Montreal (the last town ceded) one hundred and twenty-nine years ago, inside the little stone hut which still stands a ruin, and when called on for an example of Canada as a country he reproduces his last view. Perhaps this explains it!

The Ontario Association of Architects has made a very wise move towards the putting down of an evil practice that does harm to the profession generally and injury to the self-respect of the man who indulges in it. It is the question of commissions from contractors to architects that has cropped up, and each member of the Association has been asked to send to the secretary "immediate notice of any attempt of any contractor to offer him a commission, in order that action may be taken to reduce this evil." What action will be taken perhaps has not yet been decided upon, but at all events it is time the matter were taken up, when some men "jobbing architects" make half their incomes out of "contractors' commissions."



AUSTRALIA

THE PRESENT CONDITION OF ARCHITECTURE HERE. — THE SYDNEY POST-OFFICE. — CEMENT FRONTS. — COLOR.

PERHAPS a few words on the state of art generally in these colonies may not be out of place in this, the first Australian letter, for we are passing through precisely the same transition stage from which America has emerged only within the last twenty years.

The capital here is in the hands of a comparative few, whose money was hardly earned in the early days, and whose æsthetic sense — if they ever had any — was blunted long since in the struggle. But a new generation is arising, and the wealth of the pioneers is being devoted to the education of their descendants either here or in England. Travel, too, has enlarged the minds and expanded the ideas of many of our younger colonists, and so we are now striving strenuously to shake off the languor which has hitherto oppressed us where things artistic were concerned. Our work, however, is all before us, for though we last year celebrated the centenary of Australia, we can barely count fifty years of our national life.

Our cities — Sydney and Melbourne especially — will bear comparison with most of the towns of Europe, but we have not yet divested ourselves of Old World ideas. Our population is mainly British and our customs are British, and, when we make any effort at all, we try to make our cities look as English as possible. But, unfortunately, we are too familiar with the more debased forms of English art, and have not judiciously exercised our right of selection. Of course, in a community such as ours, this is pardonable; but such conditions are obviously utterly fatal to the progress of anything like originality. Our climate and our associations afford us an opportunity of imparting a national character to our work; but, so far, we have not availed ourselves of it, and consequently very few, if any, of our buildings rise above the dead level of mediocrity. Many of the public buildings are very large, and cost, seemingly, was not a consideration in their erection; but they have nothing characteristic about them, save their provoking correctness and formality.

The Post-office — of which all Sydneians are very proud — is certainly a fine structure of a marked Florentine type, and, if there is nothing very original to admire in it, there is at any rate very little to find fault with, if one excepts the tower and the carvings in the spandrels of the Pitt Street front. The tower itself is not unpleasing, though it would have been more effective if the portion below the clock had been more massively treated, with fewer openings and fewer horizontal lines: it starts, however, in a decidedly awkward fashion apparently from the roof, in the centre of the main front. It has no base, and there is nothing to suggest its existence in the treatment of the façade below. And then those carvings! They are the work of an Italian named Sani, who is really capable of better things, and were executed in accordance with the suggestions of Mr. Barnet, the Government architect, from whose designs the Post-office has been erected. When they were first noticed they were laughed at, sneered at, written at and roundly abused. But Mr. Barnet treated this clamor with lofty disdain, and then the public began to get angry, and a Royal Commission was appointed to inquire into the matter. The carvings were accordingly examined, and their immediate removal recommended. The architect, who had hitherto preserved a discreet silence, then defended his creations on the ground that they were "realistic" and, therefore, of the highest type of art, and, further, that he considered the work was admirable both as to decoration and as "illustrative of the customs and costumes of the present day"; and, though the newspaper war still raged, nothing whatever was done towards carrying out the recommendation of the Commission. Sir F. Leighton saw some photographs of these now famous sculptures and wrote to a friend here, expressing surprise and regret that such things should be allowed to remain. This letter was published, and Mr. Barnet retorted that the President of the Royal Academy might be an authority on pictorial art, but that he knew nothing about sculpture.

One hardly knows whether to blame the architect for his wilful blindness or to praise him for his pertinacity, for this controversy took place five years ago, and these hideous caricatures still disfigure the spandrels of the Post-office.

The professional men in private practice certainly aim at a little originality, but there is still an apparent sameness about our



The Post-office, Sydney.

buildings, which is due, probably, to the extensive use of cement. Cemented fronts lend a depressing grayness to our streets, and cemented, lime-washed houses spread like a hideous white leprosy over city and suburbs, and straggle far on into the country. The following extract from an article in a local paper well explains the feeling of a clever architectural critic on this point:

"There is a special 'boom' in architecture at present. Several extensive buildings are going up which are calculated to give architects a chance to display the qualities of their art in a liberal and healthy fashion. As one travels down Hunter Street and looks along Bligh Street, a new coffee-palace looms up, impressive, lofty and cold — so cold that no summer sun will ever make it look warm, no morning radiance or evening glamor ever redeem it from a frigid solidity. As one looks west from King Street one sees the same — the cold, gray stucco of another coffee-palace. As one turns in from George Street to look for the *Maison doreé*, another pepper-and-salt building greets him. All are well-built enough, but an architect has something to consider besides form; he must regard color also if his work is to show to good advantage. Her Majesty's Theatre is another example of a fine building with a homeless, comfortless color, in striking contrast to the warmth of Farmer's warehouse opposite. The Athenæum Club is still another brilliant showing of good form and bad color. Compare the effect of the Union or the New South Wales Club with that of the Athenæum. It is geniality set against cynicism; welcome set against repulsion. No outline, no strength in form and imposing freedom of style will ever overcome bad color. The handsomest, homeliest buildings in the city are of brownstone."

This Sydney stone, by the way, is a splendid, close-grained sandstone, soft and easily worked. It, however, hardens by exposure and deepens into a warm, yellow-brown tint, which harmonizes well with almost anything and lends a charm to the vilest conceptions, the Post-office carvings, of course, excepted. Our architects seem to be quite content to vary the monotony of their stone fronts — for even Sydney stone becomes monotonous if used too freely — by introducing gray and red granite columns, and sometimes a gray granite base, but these devices merely give a restless look to the architecture, without in any way satisfying one's color-sense. The cost of the stone, however, prevents its being generally used, and consequently cemented façades, lined in imitation of stone, confront one everywhere.

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF GEORGE J. MCGOURKEY, ESQ., 6 EAST EIGHTY-SIXTH STREET, NEW YORK, N. Y. MR. JOHN M. DUNCAN, ARCHITECT, NEW YORK, N. Y.

[Helio-chrome, issued only with the Imperial Edition.]

HADDON HALL, DERBYSHIRE; THE LONG GALLERY, HADDON HALL, DERBYSHIRE; HARDWICK HALL, DERBYSHIRE; FORD HOUSE, DEVONSHIRE; SHERBORNE LODGE, DORSET; AUDLEY END, ESSEX.

[Issued only with the Imperial Edition.]

THESE plates are reprinted from Hall's "*Baronial Halls and Picturesque Edifices of England.*"

MISSION SUNDAY-SCHOOL BUILDING FOR THE PRESBYTERIAN CHURCH, MINNEAPOLIS, MINN. MESSRS. G. W. & F. D. ORFF, ARCHITECTS, MINNEAPOLIS, MINN.

THE materials used in this building are Duluth brownstone, with roof covering of red tiles. The interior, where chairs will be used for seats, is in oak. Cost, $10,000.

RANDOLPH MACON ACADEMY, LIBERTY, VA. MR. W. R. POINDEXTER, ARCHITECT, WASHINGTON, D. C.

TOWER OF THE CATHEDRAL, OVIEDO, SPAIN.

DESIGN FOR AN OFFICE-BUILDING. — ENTRANCE TO A HOSPITAL. MR. ARTHUR TRUSCOTT, ARCHITECT, PHILADELPHIA, PA.

THESE designs won honorable places in competitions of the T-Square Club.

PRESBYTERIAN CHURCH, LIBERTY, MO. MR. WILLIS POLK, ARCHITECT.

THIS building was erected at a total cost of $6,743, exclusive of cost of seating.

London



THE OLD AND NEW EXAMINATIONS OF THE R. I. B. A. — THE REGISTRATION BILL AGAIN. — THE ROYAL GOLD MEDAL. — ST. MARY-LE-STRAND. — THE BUTTERWALK, DARTMOUTH. — PETERBOROUGH CATHEDRAL.

ON a wet July evening, at the fag-end of a year's hard work, I am sitting down and writing you my accustomed chat upon English architecture and its doings, not that there is very much to say, for, of a truth, the profession has been singularly dull for "Merrie England" during the last few weeks.

First of all, I suppose, comes the great change which has taken place in our professional education since I last wrote you. As you know, the entrance to the Royal Institute of British Architects has hitherto been by means of one compulsory examination, both written and oral. This examination has been of a rather severe nature, and is divided into the following seven heads:

(*a*) History of Architecture.
(*b*) Mouldings, Features and Ornaments.
(*c*) Sanitary Science, Shoring and Strength of Materials.
(*d*) Design.
(*e*) Materials and Construction.
(*f*) Specification Writing.
(*g*) Professional Practice.

Before, however, the candidate was eligible for the examination, it was necessary for him to submit the following "probationary work" to the Board of Examiners in Architecture, and to obtain its approval thereon:

(*a*) The plan, elevation and section of a building of the candidate's own design.
(*b*) A perspective drawing.
(*c*) A sheet of details.
(*d*) A drawing of some ornament from the round or relief.
(*e*) *Optional.* Specimens of the candidate's work as a student. Measured drawings, notes or essays on architectural subjects, etc.

Of such a nature was the ordeal through which the British architectural student has had to pass (up to the present year), if he desired to take any recognized position in the profession at all. You will at once see what was the natural outcome of such a system. The pupil, on first entering an office, considered the examination to be quite out of the reach of practical politics, to trouble himself about anything so far in the future was a work of supererogation. Time slips on, the pupil remains negligent or indifferent until his articles expire, and then when he enters the ranks of assistants, it dawns on him by degrees that the time will, before long, come for him to enter for the examination. He soon finds, however, that his

knowledge is, to say the least, slender, his time is short, too short indeed for him to properly study for the examination. What is the consequence? Demand is naturally followed by supply. Our young man must learn somehow. So crammers arise and drill the book-knowledge into him and supervise the execution of the probationary work, and, after a year or so of this discipline, the examination is passed and the student straightway forgets all his crammed learning. Of course, with some earnest, conscientious men this does not apply, but it is not an overdrawn picture of the influence of the examination or the average student.

This state of affairs could not be called a healthy one, and received the serious consideration of the Royal Institute, with the result that a scheme of a triple examination was formulated by a special committee, and approved and adopted at a general meeting by the Royal Institute. As this is such an important move, I give you a condensed programme of the examination:

EDUCATIONAL SCHEME.

(*a*) Preliminary examination for admission as Probationer. (To be passed on entering an architect's office, or immediately afterwards.)

Subjects: — (1) Writing from Dictation.
(2) Short English Composition.
(3) Arithmetic, Algebra to simple equations, Elements of Plane and Solid Geometry.
(4) Geography of Europe and History of England.
(5) French, German, Italian and Latin. One language to be selected.
(6) Elementary Mechanics and Physics.
(7) Geometrical Drawing or Elements of Perspective. One subject to be selected.
(8) Freehand Drawing from the round.

NOTE: — Candidates who have passed certain specified examinations and satisfy the Council as to their skill in drawing are exempted from this examination.

(*b*) Intermediate examinations for admission as Student. (To be passed not less than two years after qualification as a Probationer and not before the Candidate has attained the age of 19 years.)

Preliminary Work: — The candidate will only be admitted to the examination on the following testimonies of study being considered satisfactory by the Board of Examiners.

TESTIMONIES OF STUDY.

Art Section: — Two sheets of the Orders of Architecture fully figured, drawn in outline with the ornament and enrichment filled in: each sheet to comprise two columns of the Order with entablature complete, drawn to a scale of half-inch to a foot and details one-eighth full size.

One sheet of details of Classic Ornament, in outline.

Two sheets with one example each of the Early English, Decorated, or Perpendicular periods, such as a door, a window or an arcade, in plan, elevation and section.

One sheet of details of Mouldings and Ornament relating to such examples, to scale.

One sheet of Ornament, freehand drawing from the round, in outline.

Science Section: — One sheet with diagram of Timber-framed Roof-truss, not less than 30 foot span, with the nature of the strains on the several parts marked thereon, and the junction of the timbers and iron-work drawn to a scale of 1½ inches to the foot, all in isometrical projection and dissociated.

One sheet showing in a similar manner at least three varieties each of Timber Floors and of combined Iron and Timber Floors.

Two sheets of details of Joiners' Work in doors, windows and fittings shown in plan, elevation and section to a scale of ½ inch to the foot.

WRITTEN, GRAPHIC AND ORAL WORK.

Art Section: — (1) The Orders of Greek and Roman Architecture, their origin, development and applications.
(2) The several varieties of Classic Ornament.
(3) English Architecture from the Conquest to A. D. 1500, and the successive developments of the Styles.
(4) The characteristic Mouldings and Ornament of each period

Science Section: — (1) The nature of ordinary Building Materials as stone, brick, tiles, timber, metals and their qualities and defects.
(2) Elementary Physics as applicable to Building.
(3) Mensuration, Land Surveying and Levelling.
(4) The calculations of Strengths of Materials and Resistances from data and formulæ given
(5) Plane Geometry applied to actual work. Projection of Solids and development of Surfaces.
(6) The Elementary Principles of Construction.

(*c*) Final examinations to qualify for candidature as Associate R. I. B. A. (To be passed not earlier than two years after Qualification as a Student and not before the Candidate has attained the age of 21 years.)

TESTIMONIES OF STUDY.

Art Section: — (1) A subject of Classic Architecture, shaded in sepia, india ink or hatching, according to the rules of sciography.
(2) A Study in Perspective of Mediæval, Classic or Renaissance Architecture in outline or shaded.
(3) Two Studies of Ornament from the round, shaded and hatched. One Classic or Renaissance, the other Mediæval.
(4) A design for a Building of moderate dimensions, such as a detached villa, parsonage, school, local institution or cottage-hospital, to be fully drawn out as working-drawings to a scale of not less than ⅛ inch to the foot, in plans, elevations and sections, duly figured and showing construction, water-supply, drainage, ventilation, etc., with sheets of details of the construction and ornament and a perspective view.
(5) Drawings of some Historical Building or part of a building, made from actual measurement, with the jointing of the masonry, etc., correctly shown, and the construction: the whole in plan, elevation and section, carefully figured with details at least ¼ full size. The original sketches measured and plotted on the spot are to be appended.
(6) Two or more sheets of drawings showing the construction of Roofs, Floors, Arches, Retaining-walls, etc., with all the calculations for strength of the various parts fully worked out and appended thereto.
(7) Two sheets of diagrams of Constructive Masonry. Arches, vaults or groined vaults, with the projections of the arch and vault stones. These may, if the candidate thinks fit, be supplemented by complete drawings of a groined vault of any period between 1150 and 1500, from actual measurements, in plans and sections, with details of mouldings, ribs and surfaces, accompanied by a full description of the construction and a short historical account of the building from which taken.
(8) Satisfactory evidence of having followed the carrying out of building works, and notes of the progress and conduct of such works.
(9) Any sketch-books, evidences of study of buildings and of travel, the candidate may desire to submit, not exceeding three in number.

WRITTEN, GRAPHIC AND ORAL WORK.

Art Section: — (1) The History of Architecture to be illustrated by sketches: the leading characteristics, history and development of the principal styles of architecture, particulars of celebrated buildings and their architects. The special characteristics and history of any one period selected by the Candidate which may be:
(i) Greek or Roman Architecture.
(ii) Architecture of Italy or France from the 10th Century to the end of the 14th Century.
(iii) Architecture of Italy or France from the beginning of the 15th Century to the present time.
(iv) Architecture of England for some one Century between the years 1100 and 1700 A. D.
(2) Features, Mouldings and Ornaments.
(i) As characteristic of architectural styles generally.
(ii) As characteristic of the special style which has been selected by the Candidate.
(3) Design: as illustrated by drawings of a building of moderate dimensions to be made from particulars given with details of construction and ornament.

Science Section: — (1) Materials, their nature and their application in building.
(2) Strength of Materials. Stresses and strains, the formulæ for their calculations and their graphic determination. Arches, vaults, girders, roofs, retaining-walls.
(3) Constructive details in all grades.
(4) Sanitary Science. Drainage, water-supply, ventilation, acoustics, lighting and heating.
(5) Specifications and Contracts.
(6) Measurement and Valuation of Buildings and Materials; Preparation of Estimates; The Legislative Enactments relating to Building.

I think you will agree with me that it would be difficult to draw up an examination programme of a more thorough and searching nature, than that I have just set down. Such, indeed, appears to be the pretty unanimous feeling of the whole profession, and the new scheme has been received in the most favorable manner.

The present single examination is to be continued for some few years, in order to permit the new one to be introduced gradually, as it would be manifestly unfair to expect men well on in their studies to enter for the preliminary examination.

One of the immediate results of this move on the part of the Royal Institute of British Architects has been that the great teaching body, the Architectural Association, is setting its house in order to meet the requirements for which its students will now have to prepare. A special education-committee has been appointed for that purpose.

The Registration Bill has again made its appearance before the public. On Tuesday, 2d July, Mr. Noble, M. P. for Hastings, introduced the bill into the House of Commons, and it was read a first time. It is not probable, however, that it will get any farther this session, as it is already somewhat late and there is a great block of business in the House. The bill differs a little from that introduced last year by the late Colonel Duncan, inasmuch as it is confined strictly to architects, whereas the late bill proposed to include engineers and surveyors. I have referred to this matter so fully in previous letters, that I do not think it necessary to trouble you any further with my opinions on the subject.

The Royal Gold Medal, the gift of Her Majesty the Queen, which is annually conferred on a distinguished architect or man of science upon the recommendation of the Royal Institute of British Architects, has been bestowed this year upon Sir Charles Newton, K. C. B. Sir Charles is not an architect, but an eminent archæologist, and holds the post of Antiquary to the Royal Academy of Arts. In 1840 he was chosen an assistant in the Antiquities Department of the British Museum, but gave up his expectation of promotion in the Museum for the consulate at Mitylene with a view to archæological research. He subsequently became consul at Rome, and in 1861 was appointed keeper of antiquities in the British Museum.

The various agitations in defence of St. Mary-le-Strand have apparently had the desired effect, inasmuch as the restoration-committees are proceeding with the work in serious earnest, and the

death-blow to the iconoclastic hopes of the "tradesmen in the Strand" is being daily dealt out by the sound of chisel and saw hard at work putting the church in order.

Another charming piece of old-world domestic architecture in Dartmouth yeclpt "The Butterwalk," was recently threatened by the Corporation — of all people in the world — who proposed to pull it down for the purpose of erecting a new post-office. Fortunately, the mayor of the town was somewhat of an archæologist and did his best to thwart the Corporation, with the happily successful result that the Butterwalk is not to be interfered with, a new site having been obtained for the post-office.

After an expenditure of over £25,000, the choir of Peterborough Cathedral has been recently opened after the restoration. The Saxon Church, which was discovered under the floor, has been vaulted over and now forms a sort of crypt. The cathedral authorities are now appealing for fresh subscriptions in order to place the magnificent west front in a safe state of repair.

The site for the new National Portrait Gallery has been decided upon. The "portraits" are to occupy the back of the National Gallery, behind Trafalgar Square. This position is a good one, inasmuch as it is central and keeps the pictures all together, but there is to be said on the other side that the close contiguity of the *chefs-d'œuvre* at the National Gallery with the portraits, many of which are of very doubtful artistic merit, will provoke invidious comparisons, and also that space that would have been invaluable for the extension of the National Gallery is being unwisely taken up.

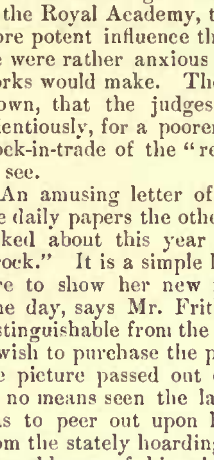
A new departure in the exhibition line has been taken this year by a collection of the rejected works of the Royal Academy. It has been hinted in a good many quarters that in the selection of pictures at the Royal Academy, the friendship of the judges often proves of more potent influence than the merits of the picture, and, therefore, we were rather anxious to see what sort of a show these rejected works would make. The result has been to show, as well as can be shown, that the judges have done their work honestly and conscientiously, for a poorer lot of pictures than those which form the stock-in-trade of the "rejected" exhibition, it has never been my lot to see.

An amusing letter of Mr. W. P. Frith, R. A., went the round of the daily papers the other day. Among the pictures that have been talked about this year is one by this artist, entitled "The New Frock." It is a simple little painting of a child holding up her pinafore to show her new frock: "*Vanitas vanitatum, omnia vanitas.*" One day, says Mr. Frith, he was waited upon by a gentleman indistinguishable from the ordinary wealthy art-patron, who expressed a wish to purchase the picture. Negotiations were satisfactory, and the picture passed out of Mr. Frith's hands. But Mr. Frith had by no means seen the last of the picture. No, its mutilated image was to peer out upon him from the back covers of the novelette, from the stately hoarding: on card and on paper wherever he went a semblance of his picture stared him in the face. The Royal Academician had unwittingly become the illustrator to an enterprising firm of soap-boilers.

I had the pleasure of attending the conversazione of the Society of Arts at South Kensington Museum the other night. The affair was a great success, though, perhaps, could hardly be called brilliant. Some 2,000 or 3,000 people were at the gathering, including most of the artistic and scientific celebrities of the day.

CHIEL.

PARIS.



BRONZE-WORK.

LET us continue our tour through the Industrial sections more particularly interesting to architects, by entering that devoted to art bronzes, one of the most important sections. For a long time, with the taste for beautiful things and fair forms becoming more and more widespread, we have become habituated to see the least of household utensils clad with an artistic envelope of graceful and elegant design. The commonest objects have now, and these too in the lowest ranks of society, a certain air of style and a generally distinguished appearance. The reproductions of objects of art and their reduction have certainly counted for much in a very real progress: the celebrated works of our great artists are thus spread widecast, and easily placed under the eyes of every one and become the educators of the public.

One of the men who have been very useful in this connection is M. Barbédienne, who has made a marvellous success of a process of mathematical reduction invented by M. Collas. Every one knows his magnificent reproductions of antique and contemporary statuary. But M. Barbédienne is not content with the rôle of imitator: he himself creates works of art and marvels of furnishing, as we see once more, at this Exhibition of 1889, his clock four and one-half metres high, which we formerly admired in 1878. This lack of novelty might be brought as a reproach against him, but it must be confessed that here we find ourselves face to face with a bit of work quite beyond the ordinary, one which cannot often be renewed. This clock forms the crowning feature of a grand decorative motive treated in the style of the Renaissance and composed by M. Constant Sevin; the general form is that of a campanile in copper, very greatly undercut and chiselled, enriched with columns and panels of red marble, with pinnacles and niches filled with figurines and statuettes by MM. Eudes and Noel, with mosaics, with cartouches, with pierced spires and enamelled paintings. It is a work which does credit to M. Barbédienne, who made it at his own expense in 1878. It is, moreover, for sale at the respectable price of 350,000 francs. Independently of this *chef-d'œuvre*, which occupies a place in the centre of the gallery, M. Barbédienne has an exhibit of great richness, where can be admired amongst other things a magnificent cabinet in marquetry of ebony and gilded and chased bronze, and with enamel paintings. This cabinet cost 67,000 francs to make. Finally, among other pretty things there are a mirror of much richness, cups, and so on, and several mantelpieces, decorated in the Greek, Renaissance, and Louis XVI styles.

I have been led to speak of this group first because the name of M. Barbédienne came first to my pen's point; but before continuing the examination of the bronzes, I would like to enumerate some of the great foundries from which come those monumental pieces which are particularly serviceable in architectural decoration. In this order of ideas, I will mention the Maison Coutellier, who executed the zinc work for the roof of the Machinery Gallery, and the statue in zinc *repoussé*, nine metres in height, which crowns the central dome. The Maison Gayet-Gauthiers exhibits, according to its custom, a reduction of the Bartholdi statue of Liberty, and beside it the ear of the goddess, full size. Some interesting models, too, represent the yards and workshops during the construction of the statue, and are accompanied by a very small panorama of New York Harbor. The horsemen in hammered copper which crown the cresting of the new Hôtel de Ville and different *motifs* of cresting and decorations for the roof of the Palais de Justice at Brussels form the exhibit of the Maison Monduit.

In speaking of the grand gallery of thirty metres, I have already spoken of the equestrian statue of Etienne Marcel, which forms the chief point in the fine exhibit of MM. Thiebault Bros.

Among several other interesting bronzes, there must be mentioned, as a piece of equal monumental worth, the monument to La Fontaine, by M. Dumilâtre, sculptor, and Frantz-Jourdain, architect, at Ranelagh de Passy, which consists of an exedra, in the centre of which is the principal subject, which makes a part of the Thiebault exhibit. From a basement in marble rises a marble pedestal, on which rests the bust of La Fontaine. This bust, like all the rest of the sculpture, is of bronze. The principal group represents the apothesis of La Fontaine, Glory and the Genius of Fable, represented under the guise of a woman, who scatters flowers at the feet of the bust, and of an infant, who holds a switch in one hand and a mask in the other. The Glory is very attractive and elegant in form, and about her floats well-arranged drapery after the manner of the time of Louis XIV. On the left, at the foot of the pedestal, a lion raises himself majestically, and the principal animals which were made use of by the fabulist are skilfully arranged in groups about the pedestal.

Among the monumental pieces in the bronze section we remark in the centre of the gallery a curious fountain in wrought-iron, very elaborately worked with the hammer after the Renaissance style. This fountain has been executed at the Maison Marrou, which also exhibits fine bits in wrought-iron, among others a grille for the Palais de Justice at Rouen, after the design of M. Lefort, architect. The cast-iron work of M. Durenne and M. Gasne, and that from the Val-d'Osne, prove that cast-iron is as ductile as bronze in skilful hands; and the exhibit of M. Baudrit has an undeniable interest from the point-of-view of wrought-iron work and artistic hardware. We can here note in the first place a vestibule grille of Louis XV style with imposed lantern of beautiful design and very pure style. This Maison Baudrit made the beautiful grilles at the entrance to the Pavilion of the Fine Arts and those of the Entrance Desaix on the Avenue de Suffren, and for the entrance on the Rue de Constantine.

As we have mentioned artistic hardware, I cannot omit the name of the Maison Moreau Bros., which exhibits the models of the stair-rail at the Château de Chantilly. Here are two panels in wrought-iron work, with a leafage in repoussé and chased copper which are absolutely superb. The *motif* of the stair-rail at its start is formed by a ram's head, between whose horns the hand-rail takes its birth. The design of the railing is a development of volutes decorated with leafage and heraldic flowers, interrupted by panels corresponding with the axes of the construction. These panels are decorated with antique bucklers and with hemlets, swords, and knightly belts. These two models have generously been offered by the Maison Moreau, one to the Musée des Arts Décoratifs, and the other to the Conservatoire des Arts et Métiers. Unfortunately the exhibit of MM. Moreau is very badly placed at the end of the Machinery Gallery. We find here also one of the balconies intended for the grand staircase of honor at the Sorbonne. It is executed in black iron and decorated with appliqué work of copper leafage, with a cartouche bearing the arms of the different academies of

France. The balcony rests on a copper base, and is crowned with a hand-rail of the same metal. Besides these large pieces, MM. Moreau exhibit also several fine examples of artistic hardware, hall lamps, chased bolts, etc.; but the thing which is missed in the Champ de Mars is the magnificient Renaissance grille which I saw in their workshops, made for Mr. Vanderbilt of New York. This would have been an absolutely unique piece to exhibit.

Returning to the bronzes, we find in the exhibit of M. Morisot, in the midst of bronzes more particularly destined for the decoration of interiors, chimneypieces of different styles in bronze and in steel. In the exhibit of M. Lerolle are two models of copper balconies for the King of Bavaria and the King of Belgium, one of which, decorated with heraldic lions sustaining themselves against the royal crown, possesses much richness. M. Collin exhibits several pretty reproductions of sculpture by Steiner, Gautherin, Carrier-Belleuse, Coutan, Carpeaux, and as his most important piece a beautiful Louis XVI clock, placed on a column, at the foot of which is a tall female figure, very fine and graceful in form, and an infant modelled by Steiner. This composition by M. Piat is very decorative and elegant. We shall find in M. Denière's exhibit a beautiful railing of wrought-iron, which was exhibited in 1878. The chief *motif* is a lyre enriched with garlands of roses in gilded bronze cast and chiselled with a delicacy and finish which are altogether marvelous.

Amongst the most interesting exhibits must be remarked those of M. Mottheau, who, among other things shows us two fine Louis XVI appliqués in gilded bronze; the lustres and lamps of somewhat too elaborate form exhibited by M. Betram-Taillet, and the products of the Maisons Millet, Raingo, Chachoin and Dalfol & Co. This latter firm exhibits a reproduction in red marble and cast steel of the mantelpiece of Germain Pilon at the Louvre (Château de Villeroy, 1590). This is a curious effort, but the result is unsatisfactory. The general air is cold and the tone sombre. The details taken by themselves are well handled and carefully worked.

Within a few days, at the Gallery Georges Petit, an exhibition has been opened of the works of the painter Claude Monet and the sculptor Rodin. Of the first I will say nothing, fearing to speak ill of an artist whom I hear those around me salute with the title of master, but of whose talent I comprehended absolutely nothing; I say talent in deference to his admirers, who are in my opinion quite as incomprehensible as their idol. M. Claude Monet, who, amongst his first canvasses had "impressions" which were really interesting, and after the manner of the good work of Manet, finishes in these last works of his by painting everything that he sees in blue, violet or yellow by little touches placed one beside another, as M. Pissaro, another master of the same class, does. I repeat, I understand nothing at all about it, and I ask myself how those who admire artists like Pelouse, Damoye, Troyon and many other ancient and modern masters, go about it to find talent in M. Claude Monet. These works certainly are not of the same kind, and it appears to me difficult to admire both the one and the other.

As for M. Rodin, we stand before an artist at once very serious and very original. The present exhibit does not contain a great number of finished pieces, but in all his sketches twisted with passion and palpitating with life, one feels the talent and the vibration of the artist's spirit. I do not intend to speak at length of the works of M. Rodin, to whom the *American Architect* has just consecrated so interesting and important a study. I will merely record that there are here at the Gallery Georges Petit two female figures which are absolutely charming, one of them, only half finished, although modelled with extreme care, bursting from the block of marble gives a strange impression of life springing from matter. Here is an extremely philosophical idea translated by this sculptor, who makes out of a morsel of little importance a very *chef-d'œuvre*. At length after long struggles and great discussions, M. Rodin is to-day very widely known and by everybody as one of our best sculptors, and one having a peculiarly original talent.

AN ARCHITECTURAL KNOCKABOUT.[1] — VI.



I LEFT Berne for Paris on one of the coldest days I have ever experienced in the whole course of my life. The train I took was a miserable one, which stopped at every place possible to stop at; but the one advantage of its slowness was that I could thus enjoy the splendid Swiss scenery. Everything was covered deeply with snow and ice. Often the train would wind through some deep valley, and I could look far, far up, sometimes almost lying down in my corner of the compartment in order to see the summit of the mountains which towered above me on both sides. Then we would emerge from the narrow defile and suddenly find ourselves looking down, from as great a height as we looked up to before, upon another beautiful, snow-covered valley. I never was able to realize how we did it, as the train did not seem to be doing any very heavy grade work. The effect of the brilliant Swiss sunshine striking the snow-covered hills and bounding from point to point far down into the valley, making exquisite tints of every shade, was too lovely for description.

I looked for a few glaciers and avalanches but saw none: we were not in the region of the first evidently, and the snow was too cold and hard for the second. But I was much interested in the Swiss mountain cottage which looked, very naturally, exactly like those little wooden châlets which we have all had given to us at different stages of our infancy. Many of these cottages had great stones and slabs lying on the roofs to keep them down in the high winds, and the sides of all were covered with peculiar little curved shingles, which produced a most picturesque effect when the sun shone on their curving lines. When these shingles are first put on, they are of a light reddish color, but they turn rapidly to a very dark brown, with streaks of silver running through each. The size of each one is about one inch and three-quarters across, and the radius of the curve is about seven-eighths of an inch.

I had an interesting conversation in French during my journey with a little Franco-Swiss boy, who was returning from boarding-school to his home near Bienne, for a holiday, he told me. He was dressed in a tight-fitting suit of black velvet, with a red "Tam o' Shanter," or *beret*, and patent-leather top-boots with hob nails. He carried a long black alpenstock, with horn handle and spike, and he informed me that he was going to walk from the nearest station to his home, over some mountains, instead of being met, as he knew his father liked to have him fearless on the ice. He was greatly interested in me the moment I told him I was an American, and plied me with the most characteristic questions, one after another. Such as: "Do the little boys skate over there in America?" "Can you have any sledding?" as he put it. "Do they have ponies?" *et cætera*, all of which I answered as well as I could, and then gave him a glowing account of tobogganing, which was to him an unknown experience. He asked me with deep interest if the American boys' fathers allowed them to have guns? I said that the American boys usually had guns at a very early age, and generally with their fathers' full permission. How his eyes widened, and what admiration was written all over his youthful countenance! "Oh!" he said, "that's the reason you all shoot so well over there!" And I had nothing to say to the contrary.



He was altogether a charming little fellow and before long had told me all about his family. His father was Swiss and his mother French, he said. Yes, he had two sisters. "And no brothers?" Oh, how he wished he had! "Sisters are no good, you know, for climbing, though Thérèse can really climb very well for a girl." He had to get out presently, and thanked me very prettily when he left, putting out both his hands for mine as he said "good-bye." I was to return and visit him, he said; he would tell his father all about me — and also ask him for a rifle immediately.

I was very lonely when the gay little fellow left me, and the rest of my journey was most uninteresting, being chiefly spent in futile attempts to get a little sleep in my uncomfortable corner.

I travelled by Neuchatel, Pontarlier and Dijon to Paris, where I arrived at four o'clock in the morning, and had myself driven directly to the little Hôtel de Florence on the Rue des Maturins.

Here I rested, and thought my plans over. I determined to get a room in the "Quartier Latin" and enter an *atelier;* and as I knew that the Ecole de Beaux Arts examinations were close at hand, I resolved to try my luck at them. Accordingly, I sallied forth, and soon secured a peculiarly shaped room in the garret of the Hôtel Mt. Blanc, Rue de Seine, at forty francs a month, *services inclus.*

Here I revelled in the delights of Bohemia. I hunted up all my American acquaintances, and they immediately "taught me the ropes," introducing me to the "Star Students," electing me to their café, and generally making me one of them. I took hold of my work at once, by entering an *atelier*, where I spent the first week in dodging wet sponges, and singing the "Boulanger March" standing on a drawing-board for the pleasure of my French fellow-students. However, I soon was allowed to "gang my ain gait," and things went on swimmingly. I had to purchase a high hat and a French *blouse*, and I found that the custom there was for an "*aspirant*" to paint an elaborate picture or some architectural motive on both back and front of this garment. Then the students would wear these ornamented *blouses* all over the city, causing no sensation whatever, as this is a well-established custom.

It was great fun sometimes to see a class of upper-men at the Ecole, rushing down from their *atelier* to some recitation. They would all yell or sing at the top of their voices and move *en masse*, forcing all before them. The *sargents de ville* never, or at least very rarely, interfere with the students of the Quartier Latin.

It is the custom among these good-natured students to have "afternoon tea" in their rooms. Each *élève* in turn asks his café chums to come to his room for a cup of this mild beverage, and after a while I quite distinguished myself by my brew. After the work of the day was over, we Americans would all assemble in some man's den, to discuss the problem that we were then engaged upon, and

[1] Continued from page 75, No. 712.

throwing the French language to the winds, we would enjoy once again the sound of our own tongue. Our host of the afternoon would produce some wafers and make some strong tea. Then, putting in a tablespoon one of those French lumps of sugar that look like dominoes, he would pour over it a little *cognac* and apply a light. The alcohol would soon burn out, leaving the melted sugar and the essence of *cognac* blended in a delicious syrup. With this and a piece of lemon stirred into each cup of tea, we had a beverage fit for the gods. In this way we enjoyed a most agreeable intercourse and friendship with one another. At six o'clock sharp we would all adjourn to some chosen café, where we would sit down at deal tables and be served with the most delicious of dinners. The *maitre* knowing very soon what each liked would never consult our choice, but relieved us from the responsibility and trouble of continually ordering a new dinner by setting before each one some old "stand-by" or new delicacy mysteriously gotten up. Our dinners never cost us above two francs, and in this way one can get the best of living for very little money. I found also that the poorer the café looked outside, the finer the *cuisine* inside.

After dinner we would all move into a sort of hall, where we had our coffee served in long vase-like glasses with slender spoons. Here we would smoke our pipes, sing as much and as loudly as we liked and relate anecdotes. Here the students would arrange for their little rambles through the country in the summer months, consult guide-books and write their letters. Here were also some American and French pool and billiard tables, and we occasionally indulged in some friendly games.

This is the student's daily life in the Quartier, varied by an evening at the theatre when he is "flush," or by a ride up and down the Seine in one of the express boats that ply on the river, moving with reckless speed, rushing madly through the arches of the bridges, dodging approaching boats and turning the curves with daring skill. Then the "students' ball," the festivities at Mi-Carême and other occasional gayeties are a great amusement in their way. The life is truly most Bohmeian and most fascinating. On Sundays, the Americans nearly always go to their own churches, and if they are lucky enough to have some friend or relative in the city, promptly show up at or near their dinner-hour. In the afternoon a ride or a walk up the Champs Elysées, or a saunter through the Bois de Boulogne is in order, for the beautiful sights in either neighborhood alone are worth a trip to Paris.

All these things, I, though a student of little over a month, became accustomed to, and fell in with as naturally as if I had done them all my life. The independent mode of existence pleased and fascinated me. I think one would never tire of it — indeed, the great danger is, that once understood and enjoyed, it is almost impossible to leave it. I soon knew the city thoroughly. I could strike the right bridge across the Seine to the Quartier every time, and many are the frolics we students had on the renowned Pont du Carrousel.

The best and cheapest way for a man to get an idea of Paris is to go either to the Arc de Triomphe or to the Place de l'Opéra, and mount to the top of one of the great lumbering barges that run along the boulevards; then for about four cents he sees the whole city from end to end, from the commanding height of a Parisian "bus."

In order to be allowed to take the Ecole examinations, I was obliged to be indorsed by the American Minister and presented to the Registrar at the school to get my number, for by our numbers only we were known. On the day set for the first examination, in charcoal drawing, we all, that is we "*aspirants*," assembled in the court-yard of the Ecole about 7.30 A. M. While we waited, some of the students struck up some wailing French songs, piteous appeals for mercy, which we all sang slowly, dancing in a ring around the little fountain in the centre of the court.

At last we were allowed to get our places, and found that the object of our first examination was a large embossed vase, most difficult to draw, with "trick" lights and reflections turned on it to make our labor doubly hard.

Gens d'armes, or rather police monitors, who, in their gaudy uniforms looked exactly like gens d'armes, thronged the floors, passing up and down among the students and watching them narrowly to prevent any communication, ever ready to shout "I have thee!" While working, the students could hum tunes, whistle softly and smoke as much as they liked, which made the work much easier. These examinations continued for the next sixteen days. The next one was in "*modellage*," during which we were locked up in little stalls for several hours alone with our work, food and tobacco being passed in to us through the window in the door. Then we had water-colors, then the History of Architecture, and finally the *Grand Projet* or *esquisse*, which was the great test, and which we worked at, again locked up, for sixteen hours, guarded by the same officials.

The problem was as follows:

"SECTION D'ARCHITECTURE.

"Le professeur de théorie propose pour sujet au concours.

"Un portique sur une terrasse. Cet édifice serait érigé dans un jardin public sur le bord d' une large terrasse élevée de six mètres au-dessus du sol de ce jardin. D'un coté les points d'appui extérieurs seraient établis à plomb du mur même de la terrasse; et de l'autre, ils seraient élevés seulement de quelques marches au-dessus du sol supérieur.

"Par deux escaliers situés aux extrémités du portique on établira la communication entre le niveau du jardin et celui de la terrasse. L' ordre est laissé aux choix des concurrents.

"La longueur totale du portique n' excédera pas 40 mètres.

"On fera le plan sur une échelle de 0m 0025, une coupe, et une élévation générale, faisante voir le mur de terrasse avec le portique au-dessus, au double, (0m 005 pour mètre.)

"On fera de plus le détail d'un chapiteau à l' échelle de 0m 05 pour mètre.

"*Nota.* Les esquisses non lavées devront être mises au trait, à l' encre.

"*Signé*, GUILLAUME.

"Paris, le 8 Mars, 1888, Concours d' Admission.

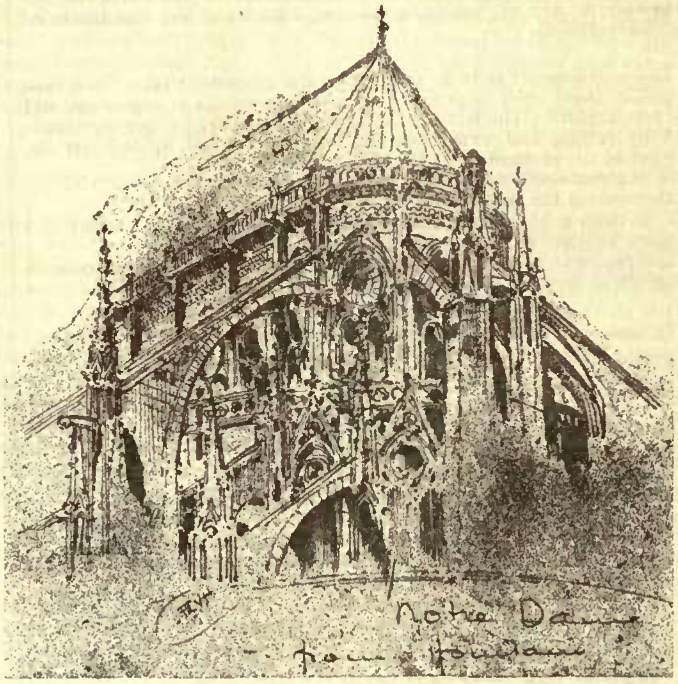
"Aspirant ——

"Esquisse —— "

I give this problem here, as I think it may be of some use to any student who thinks of trying the examinations. This is a good example and takes in all the requirements.

In my problem, I used the Doric order as it was much the easiest to handle in making the large detail required; indeed to make a correct detail of any order, Doric or otherwise, was very difficult, when one was locked up with no "*Vignole*" to consult.

Having finished my task before the time was up, I made a perspective of my portico and colored it in a "sketchy" manner, which evidently took with the faculty; at least I was awarded a high mark



on my drawing. This was my last examination. I did not take the mathematics, as those came later, but went off immediately to Nismes to make some sketches, while I awaited the results of my venture. I had left my address at the Ecole, and at last, after ten days of waiting I found at the Nismes post-office a telegram for me saying simply, "*Vous êtes reçu.*" I was happy indeed, and celebrated the occasion by a big dinner.

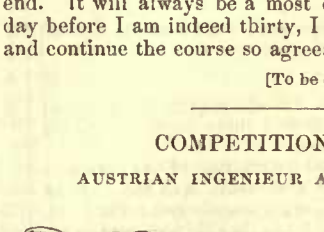
I was now an "*éligible*" and could take my place at any time among the students at the school, although I should have to pass my mathematics before getting into the first class. One is eligible until he is thirty, and as I had several years between this and that period of my life, I felt that I might easily return some day to Paris, and become in truth a "Beaux-Arts man."

After this, many of the students went away on different trips, and I, too, pulled up my stakes; my life in the Quartier Latin was at an end. It will always be a most delightful memory to me, and some day before I am indeed thirty, I hope to go over again to gay Paris, and continue the course so agreeably begun. F. L. V. HOPPIN.

[To be continued.]

COMPETITIONS IN AUSTRIA.[1]

AUSTRIAN INGENIEUR AND ARCHITEKTEN VEREIN.



THE Austrian Society of Engineers and Architects has forwarded a copy of the Regulations as to Competitions for the supply of Designs within the sphere of the Professions of Architecture and Civil Engineering, as adopted at a business meeting of 27th of April, 1889,

[1] Certain Rules for Competitions *in Sweden*, which have been agreed to by fifty-one Swedish architects, are published in the *Builder* for 27th July, 1889, p. 60. Members can therefore compare the Swedish paper of Regulations with the Austrian one here printed.

and a translation of the same is here given, copied from the *R. I. B. A. Journal*: —

Every competition is to be based upon publicly advertised conditions, and the following points must in every case be attended to.

I.

The name and address of the promoter of the competition must be given.

The promoter reserves to himself in the conditions the right of free choice among the submitted designs, and acquires the ownership of the premiated designs as well as of any competitive design he may purchase, upon the condition that the preparation of working-drawings and the superintendence of the carrying-out of the selected design shall take place only under the conduct of the respective competitor, or — with his consent and by arrangement with him — under that of some other professional man. (The competitor entrusted with the preparation of the working-drawings and the superintendence of the work is to be paid according to the scale of fees established by the Verein.)

The promoter undertakes to defray the cost of the whole proceedings, and to pay the same, as also especially the advertised premiums, at latest within one month after the close of the exhibition of the competitive designs; and this undertaking is to be expressly given in the advertisement inviting the competition.

II.

The names of the professional men and experts appointed by the promoter to act as assessors and to formulate the conditions of the competition.

III.

The assessors are to be so selected by the promoter that at least two-thirds of them shall be professional men (architects or engineers) and the rest experts. The latter must be not technicists, but persons qualified by calling and experience to form a practical opinion on the subject of the competition.

In international competitions foreign professional men will be included among the assessors.

The number of assessors must always be odd (three at least) and proportioned to the magnitude of the subject.

The payment of the individual assessors will be in accordance with the scale of fees established by the Verein.

IV.

The assessors have unrestricted right of award of premiums, and the exclusive right of opening the sealed letters accompanying the premiated designs.

The assessors assume with their appointment the obligation of drawing up the conditions, of impartially and without prejudice carrying them out, and of abstaining from taking part either directly or indirectly in the competition itself.

The duty of the assessors is: —

1. To keep minutes of all their common deliberations. (Materially dissentient opinions of the assessors will be entered in the minutes.)
2. To prepare an official decision, in which all the submitted designs conforming to the conditions and admitted to compete are criticised with respect to their merits and demerits.
3. To draw up a report giving a review and comparison of the several particulars of the qualified designs, and announcing the result of the competition.

The assessors will in their report state whether, having regard to the conditions, they recommend one of the competitive designs for execution, or whether they consider that one of the designs should be revised or a fresh competition invited.

The minutes, the official decision, and the report, are to be signed by all the assessors.

It is further incumbent on the assessors: —

4. To draw and issue the warrants for payment of the premiums.
5. To publish in the professional journals the official decision and the report (at least in abstract), and to insert in the most widely circulated daily papers an announcement of the result of the competition.
6. To arrange the public exhibition of the competitive designs, together with the entire minutes of proceedings, the official decision, and the report of the assessors upon the designs.

V.

The requirements and wishes of the promoter, in conjunction with local investigations to be made by the assessors, form the basis for the instructions to competitors, in which what is indispensably necessary and what is desirable must be clearly and unequivocally discriminated and set forth.

The instructions must also express all special requirements and all other circumstances relating to the execution of the work.

VI.

As a rule, the conditions of the competition will require drawings of only the simplest description (sketches), and of these such only as are indispensably necessary to explain the design.

The conditions will state the number and description of the drawings required, and the scale to which they are to be made. (In the case of single houses as a rule 1 : 200; in that of larger buildings 1 : 400.)

Drawings other than those specified will be excluded from consideration. The style of the drawings is left to individual competitors if the conditions contain no special stipulations on that point.

VII.

In cases where the cost of the intended work is not with the promoter a determining item, an estimate will not be included in the requirements of the competition.

If on the other hand the promoter makes the execution of a work partly dependent upon the question of cost, the conditions must require an approximate estimate and specify the manner and form in which it is to be made out. In such cases therefore the question of cost will be taken into account in judging of the designs.

If however it be expressly stipulated in the conditions that a certain maximum sum shall not be exceeded, then the question of cost becomes primarily decisive in judging of the designs. In such cases the conditions will stipulate for exact and easily-checked estimates, and will specify the standard prices according to which they are to be moneyed-out.

VIII.

The conditions will contain a stipulation that each competitive design shall be accompanied by an explanatory description, wherein the leading idea involved in the composition is to be stated, its scientific reason demonstrated if necessary, and the proposed materials and mode of execution described.

IX.

The competitive designs are to be sent in unsigned, and to be provided each with a distinguishing mark. The name and address of the competitor is to be contained in an accompanying sealed letter, which letter is to bear on the outside the same distinguishing mark and an address for the return of the papers.

X.

The conditions will prescribe the place to which the competitive designs are to be forwarded and the latest date for their reception, and also state the manner in which their receipt will be acknowledged. Competitive designs received at a later date will be admitted to compete only in cases where their non-delivery in proper time is demonstrably owing to the fault of an outsider.

XI.

The conditions will state the number and amount of the premiums. (The amount of the lowest premium will be at least equal to the sum which according to the table of fees of the Verein is payable for a similar service.)

The conditions will further state whether the promoter reserves to himself the right of purchasing at a specified price other designs besides the premiated ones, or whether such a purchase is to be matter for mutual agreement.

XII.

The conditions will state whether the competition is a native or an international one, and who are the persons entitled to take part in it.

The competitors are bound to adhere strictly to the stipulations of the competition, and particularly to fulfil the requirements set forth in the instructions. But, in consideration of the sacrifices they are willing to make, they are entitled to demand that their designs shall not merely be examined from the point of view of professionals and experts and considered on the basis of the competition conditions only, but also that a reasoned-out judgment upon all the designs conforming to the conditions of the competition shall be drawn up and, together with the report, communicated to them after the close of the competition.

Each competitor is bound, upon requisition by the promoter, to undertake the preparation of the working-drawings and the superintendence of the execution of the selected design of which he is the author, upon the terms contained in the conditions of the competition, otherwise according to the scale of payment established by the Verein.

The author of a premiated or purchased design has the right to dispose of his intellectual or artistic production in some other quarter, unless within three months from the closing day of the public exhibition his design be by the promoter ordered into execution.

XIII.

After expiration of the time appointed for sending-in the competitive designs, the designs will be opened in the presence of at least two assessors, and the sealed letters handed to the chairman of the assessors for safe custody.

The designs will be examined by the assessors first as to their admissibility, and those will be excluded from the competition which conflict with any one of the requirements set forth in the conditions; and particularly: —

1. Designs which have not been received in proper time, excepting on proof of obstacles in the way of delivery.
2. Designs of which the estimate is evidently faulty or so made out that it cannot be checked without drawing it up afresh.
3. Designs which appear to exceed by 15 per cent the approximate maximum sum mentioned in the conditions, or designs in which the fixed limit of cost is exceeded when the notified standard of prices is taken as a basis.
4. Designs which exceed the limits of site or do not comply with the prescribed heights.
5. Designs which, as regards the drawings or the calculations, are incomplete or so indefinite as not to admit of exact criticism.

Besides the foregoing, the design of any competitor who attempts in any way to bias the assessors or any of them either before or during their deliberation, as also designs the intellectual property [*geistiges Eigenthum*] of another person, will be excluded from consideration and from the competition.

XIV.

In competitions where the checking of the estimates or of other calculations involves a considerable amount of labor, the examination of the designs in this respect will be made by professional men called in expressly for the purpose. The result of this checking is, however, subject to verification by the assessors, who alone are responsible for its correctness.

After the admissibility of the submitted designs has been decided, the actual criticism of the competitive designs will take place.

This criticism proceeds solely and wholly upon the basis of the published conditions and instructions; the assessors in judging the designs must therefore take into account no circumstances other than those expressed in the conditions and instructions.

By repeated conscientious examination of the designs admitted to the actual competition, it will be ascertained which of them fulfil in a meritorious manner the requirements and instructions of the competition, and the promised premiums will be adjudged to the best among these.

XV.

If designs are received which fulfil the conditions of the competition, the promised premiums will be given in their order to the authors of the relatively best ones, even though none of those designs in its then form can be recommended for carrying into execution.

If there are fewer qualified designs than the number of premiums offered, there will be only so many premiums awarded as there are designs which with unimportant alterations might serve for carrying-out.

Among the number of designs qualified as accordant with the conditions of competition, to which premiums are adjudged, should there be two or more so nearly equal in merit that the assessors are not agreed as to the order in which the premiums should be awarded, then the sum-total of the premiums adjudged to those equivalent designs will be divided equally among the authors of the said designs.

Designs, other than the premiated ones, which fulfil in a meritorious way the requirements and instructions of the competition, shall have due recognition by honorable mention, and perhaps may be recommended to the promoter for purchase.

XVI.

The locality where the public exhibition will take place, and the duration of the same (at least one week), will be advertised in the professional journals and in those daily papers in which the competition was advertised.

XVII.

All the competitive designs which neither receive a premium nor are purchased, will be returned to their authors free of charge, within a month after the close of the exhibition, accompanied by a copy of the official decision and the report of the assessors.

XVIII.

The premiated as also the purchased competitive designs become the property of the promoter, with the limitation mentioned in Sec. I.

All the competitors retain the intellectual ownership [*das geistige Eigenthumsrecht*] of their designs.

If for the purpose of carrying-out the work a peculiar or novel idea be borrowed from some other of the competitive designs than the one ordered into execution, the promoter will have to come to an agreement beforehand with its author in respect thereof.

XIX.

The conditions will state whether the preparation of further drawings and the superintendence of the execution of the work will be guaranteed to the author of the first premiated design, or whether the promoter reserves to himself a free hand in the selection of the design to be carried out.

The competitor entrusted with the preparation of the working-drawings and the superintendence of the work is to be paid according to the scale of fees established by the Verein.

XX.

If in the case of a specially important work it be deemed proper to let a general public competition be followed by one limited to the authors of the premiated designs, this will be announced among the conditions of the former competition. In this case, the assessors in concert with the promoter will formulate special instructions for the limited competition, based upon those conditions, and will proceed in accordance therewith to judge the designs, the authors whereof will be equally remunerated. The new competition, which in the material points of its instructions must agree with the first one — since it refers to the same matter — will not only state the amount of remuneration, but will also contain a proviso that, save in the case of some agreement being made on the point, the further preparation of drawings and the superintendence of the execution of the work will be guaranteed to the author of the best design in that limited competition.

XXI.

The publicity of the proceedings will be assured: —

1. By the advertisement of the competition in the most widely circulated daily papers, and by its announcement in the professional journals, with a notification of where the conditions and instructions may be obtained.

2. By publication in the professional journals of the official decision and the report of the assessors, if not in full at least in abstract.

3. By the public exhibition of all the designs conforming to the conditions of the competition, at which exhibition the conditions and instructions, the entire minutes of proceedings of the assessors, and their official decision and report, are accessible to everybody.

4. By the announcement, to be published in the most widely circulated daily papers, of the result of the competition and the name of the author not only of the premiated designs but also of the designs which meritoriously fulfil the requirements and instructions of the competition.

NOTES AND CLIPPINGS

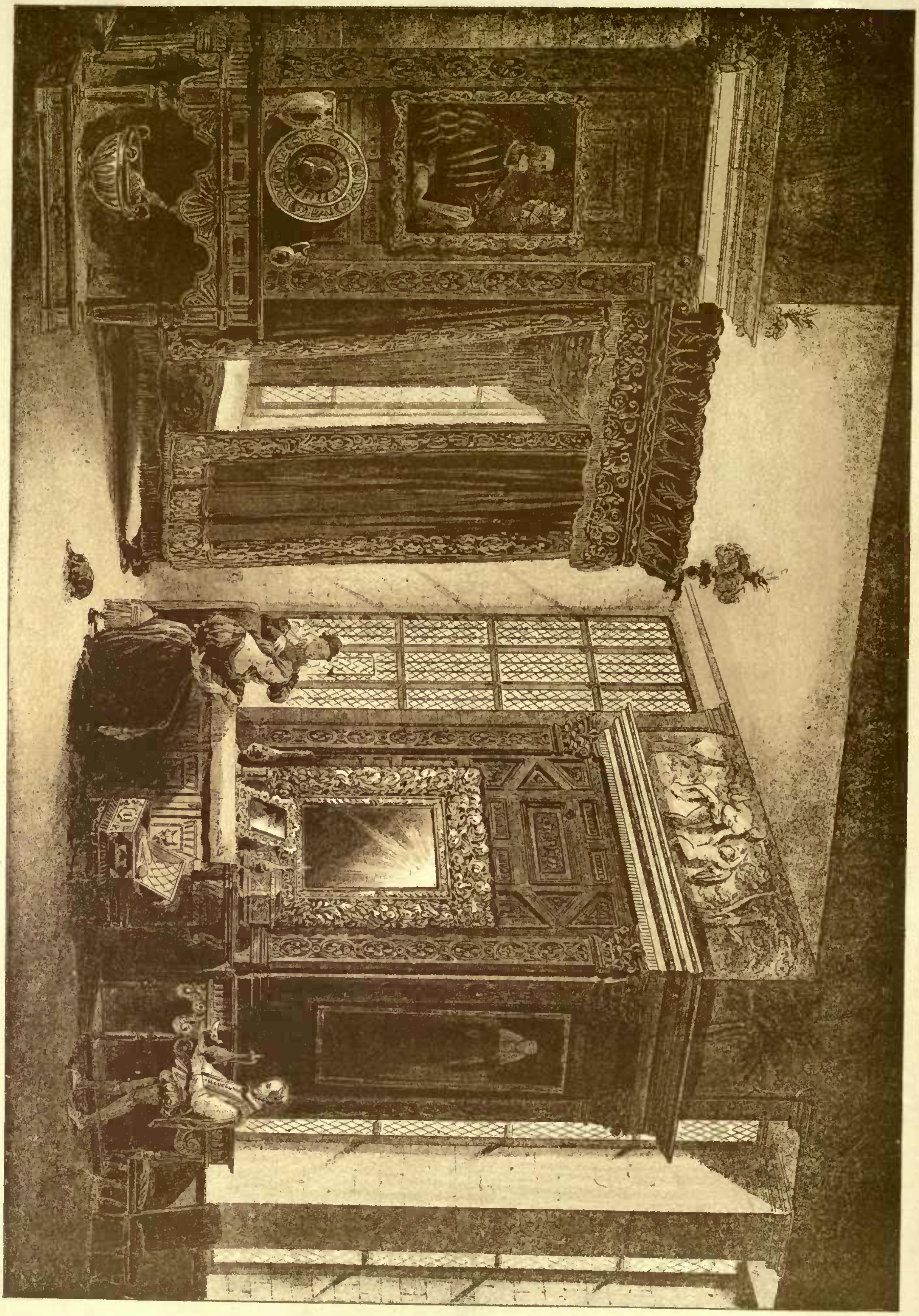
Graveyards in London. — A return has just been issued from the Home Office, dealing with the subject of metropolitan cemeteries. Of the twenty-three cases which have fallen within the scope of this inquiry, it appears that the City of London and Tower Hamlets Cemetery, Mile-end, leads off with a ghastly tenantry of some 247,000 bodies, while All Souls', Kensal Green, occupies the largest area, comprising some sixty-nine acres, and also enjoys the priority in respect of age. As regards the space allotted for each grave, some disparity is observable, 9 feet by 6 feet 6 inches being the maximum limit. The common interment system is very general, it being, for instance, the practice in some districts to bury as many as eight to ten adults, or twelve children and grown-up persons mixed, in a common resting-place. — *London Daily Telegraph.*

TRADE SURVEYS

It is both a favorable and an unfavorable indication of a healthy financial and commercial condition that a powerful clique of Government bond-holders in New York and elsewhere are endeavoring to induce the Secretary of the Treasury to buy largely of bonds, and to pay a high price for them. It may not be known to the business world that there is a strong financial party seeking to unsettle general confidence in the financial stability. They are waiting for an opportunity to prove to the country that there is danger ahead. If they succeed in this scheme, the resulting disturbances will inure greatly to their advantage, but to the great loss and disadvantage of the mighty business interests whose prosperity calls for confidence and permanency in all commercial relations. It may seem like sounding a false alarm, and perhaps like making a false statement, to assert that there are those in this country who would be glad to see a greater or less financial disturbance, by which business interests great and small would be obliged to make sacrifices in order to carry out existing engagements. With very few exceptions, business men are promising to do things on the strength of the promises of others to do certain things first. There is an immense amount of this mutual promising afloat. Certain financial managers know this, and know that this volume of dangerous obligation is steadily increasing; and they believe that the time will come when something will give way, failures will occur, and there will be a general skurrying to the banks and money-lenders for extra and unusual accommodations. If such a thing should occur, banks will restrict discounts, call in every available dollar, and in this way add to the stringency and distress. It is not intended to say that such undesirable results are in the near future; the purpose of the above reference is, simply to keep the fact in mind that powerful agencies are at work to do ill to the general business interests. The manufacturing interests are in even better condition than they were seven days ago. A steady influx of orders is reported in nearly all branches. The iron and steel makers show that there is no falling off in demand or inquiry; steel rail-makers report an extraordinary demand for repairing requirements, but a less than average demand for rails for new roads. Several new enterprises for the laying of pipe-lines are under consideration, some of which have reached the ears of iron-makers, and some have not. One authority estimates that there are now about 500 miles of petroleum and natural-gas lines projected for construction this fall and next spring. The nail factories all over the United States are working nearly full time; the barbed-wire manufacturers are pretty well crowded with work; the manufacturers of builders' and shelf hardware are crowded with orders, particularly in the works located in New England; the manufacturers of house-finishing material are hurrying forward deliveries on early summer contracts; the makers of stoves, ranges, heaters and similar supplies, especially house-keeping devices of improved style, are all pretty well crowded with work; the makers of brick are hurrying forward deliveries on spring work, many of them having met with serious losses of late; the makers of small engine and boiler work for farms, plantations, mines, factories and shops, and for warehouse purposes, have more work just at present than they have had for a twelvemonth. In this particular direction competition has, of late, brought margins down to a very low limit, and quite a number of makers of machinery for steam-purposes are barely making two ends meet.

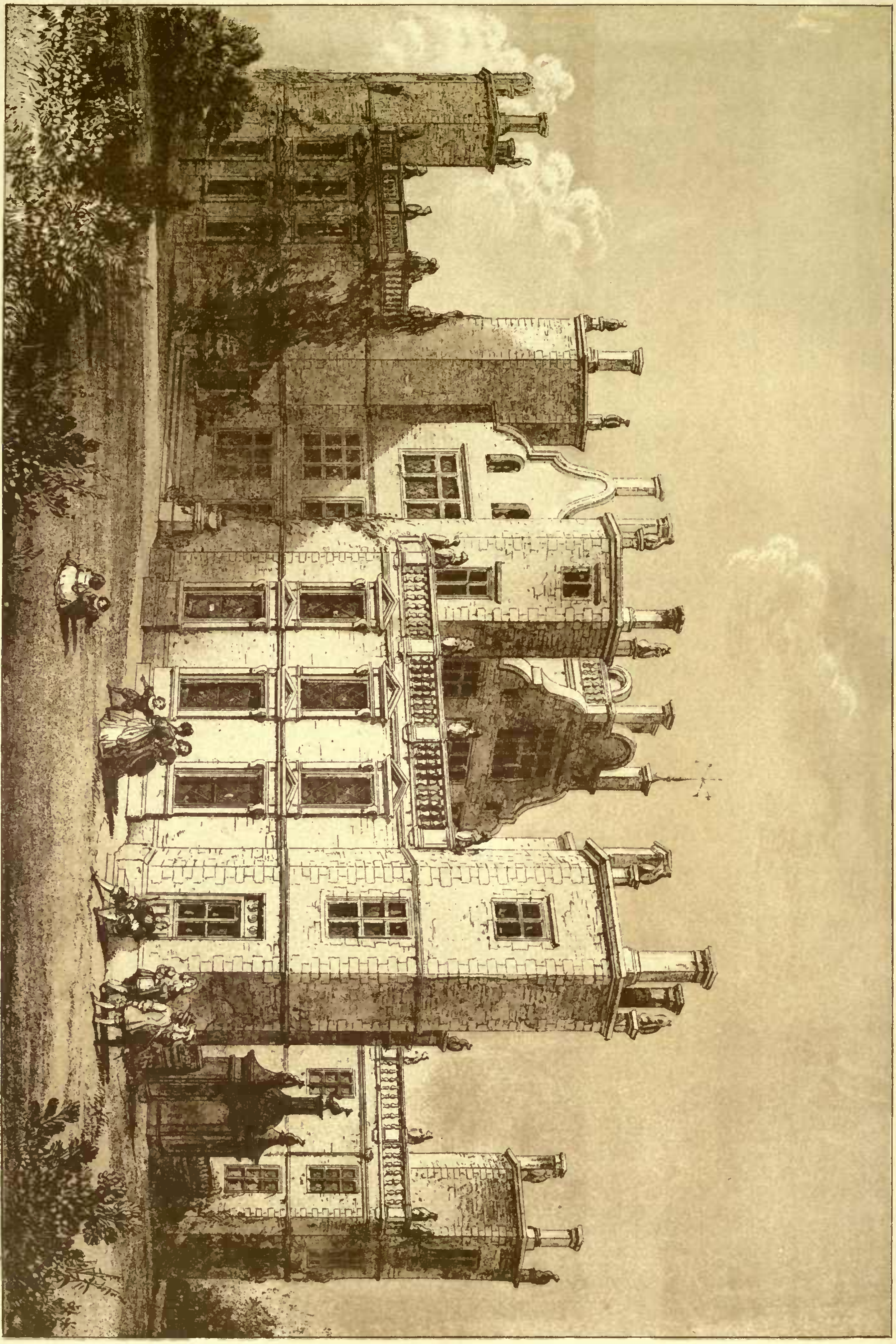
Taking manufacturing interests in general, the output measured by horse-power, including electrical machinery, is far beyond any previous record. In nearly every industry, plants, floor-space and motive-power are being expanded or increased. There is a very deep-seated impression among the practical men who control the manufacturing interests of the country, that a greater output can be profitably marketed during the coming year. This confidence is manifested in almost any direction one may look; there is evidence of it in every State in New England. Industries are springing up or expanding in Maine, which have been at a standstill for almost a generation. Massachusetts is not lagging behind in new enterprises. The West and the South may be gaining in some directions; but the manufacturers of the New England States are keeping abreast in other directions. In all the larger cities West, there are evidences of an activity that promises to last throughout the year. This is particularly so in building operations. Our latest advices from many rural sections confirm what has been heretofore said concerning great activity in house and shop building, where special inducements in the way of cheap land, low rents, and perhaps cheap fuel and cheap labor exist. The location of new enterprises is now particularly looked after, and a new concern starting up has a very delicate problem to consider in deciding whether to locate in Pennsylvania, Alabama or Missouri; whether near water or rail transportation; whether near markets, or near cheap fuel supplies. The problem is a very fine one, and its proper solution very frequently determines the degree of success to follow. Alabama and Georgia are attracting more attention now than almost any other States, from iron-working and textile interests. Southern textile manufacturers are finding themselves brought up with a round turn before the problem of non-diversification. The mischief resulting from erecting too many looms for the production of cotton cloth, will soon be removed. Southern textile manufacturers have learned much and learned rapidly; but have a great deal yet to learn, before that great industry can be said to rest on a solid foundation. As to the iron interests, not a word of fault can be found; the new furnaces are all over-sold; the iron-making and using establishments are all busy; the car-builders everywhere have a summer's work on hand. The August business at the northern locomotive works, so far as reported, shows that railroad managers are preparing to put their locomotive-power in first-class condition. The lumber trade is gathering some little activity. Petroleum statistics point to a possible scarcity in that product; but the markets certainly show no fears of that kind among operators; they have been alarmed so often with the cry of "Wolf" in the way of a giving-out of wells, that they do not now attach much importance to what seem to be well-grounded figures, indicating a steadily declining production and decrease in stocks. The anthracite coal trade has not been up to the usual August limits, so heavy dealers say, for the reason that buyers do not understand how outside prices can be maintained, in the face of increased productive capacity. While there is a combination, there is also freer competition than years ago. Supplies can be more promptly forwarded over the new bridge across the Hudson; but competition by way of the Sound is still maintaining a large traffic that way. There is unusual activity in nearly all Western bituminous mines.

S. J. Parkhill & Co., Printers, Boston.



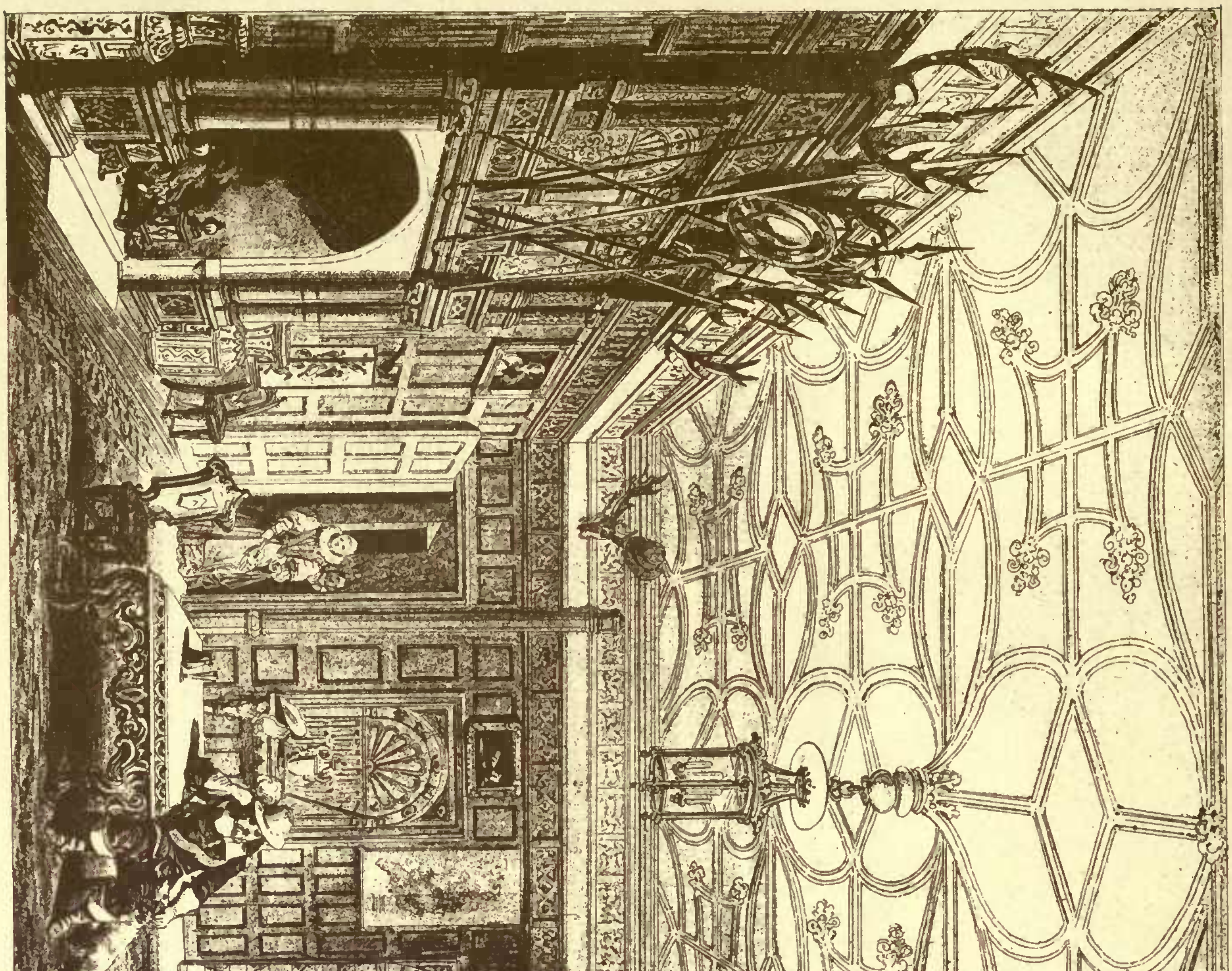
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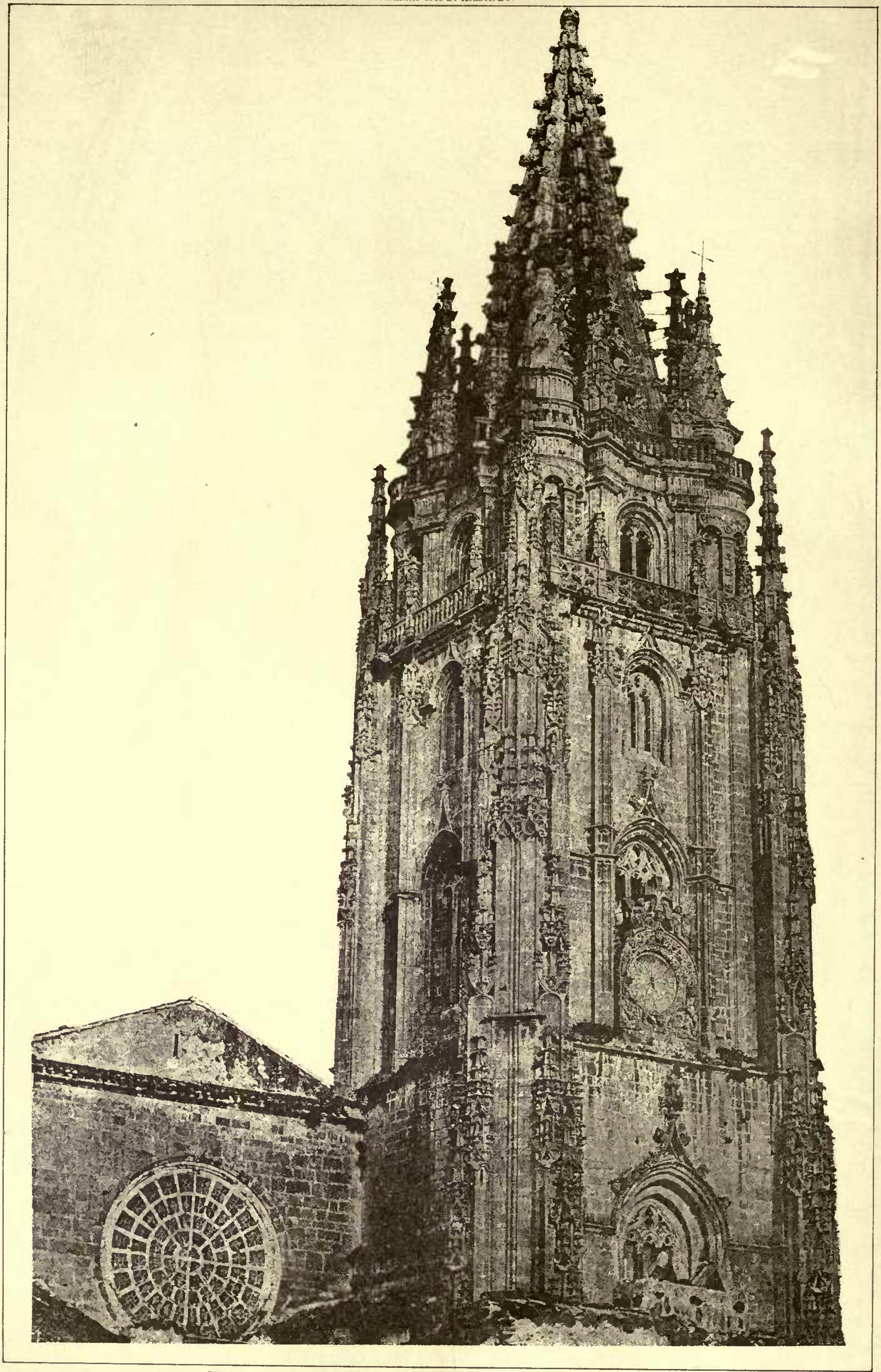
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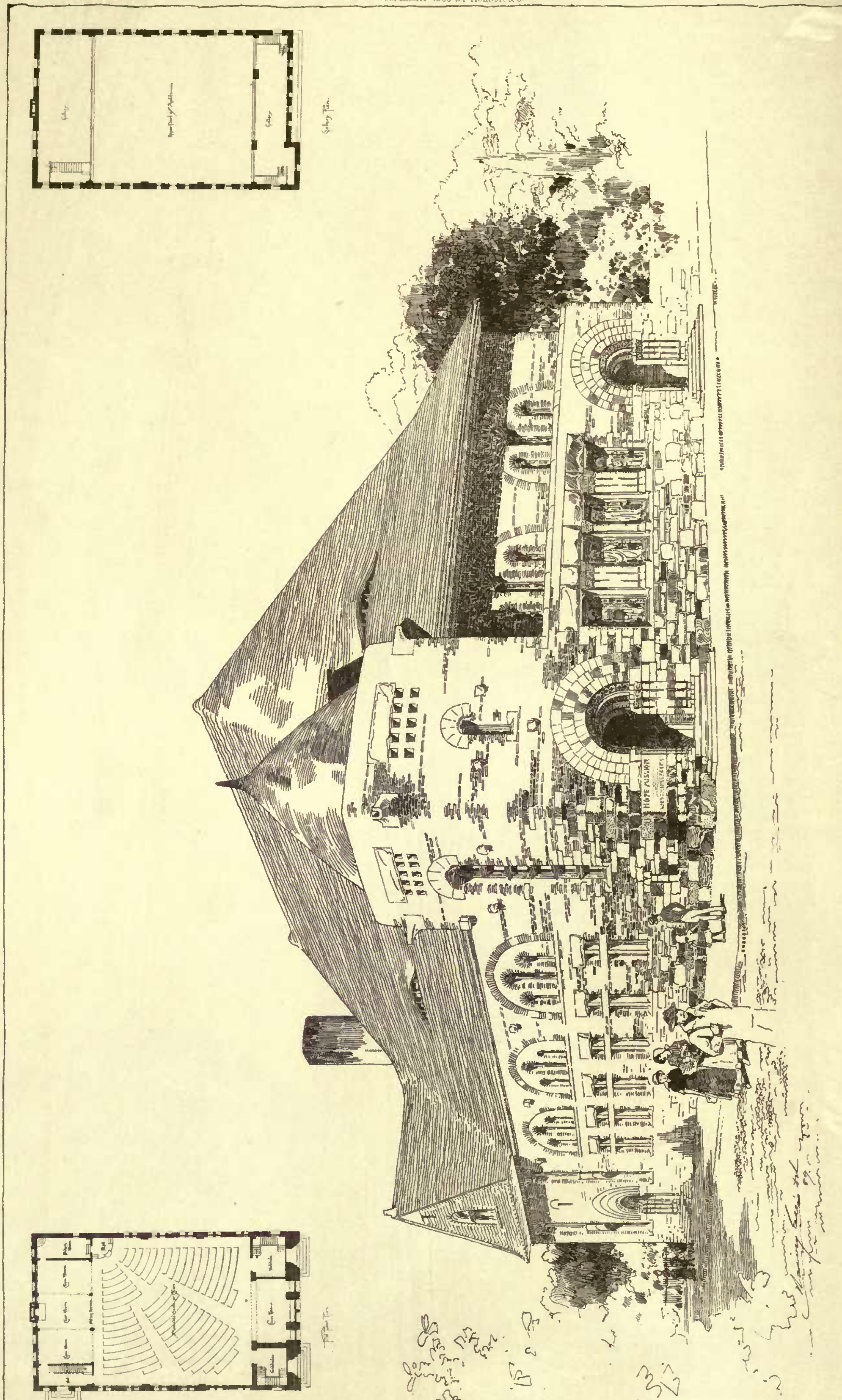
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TOWER OF THE CATHEDRAL · OVIEDO · SPAIN ·

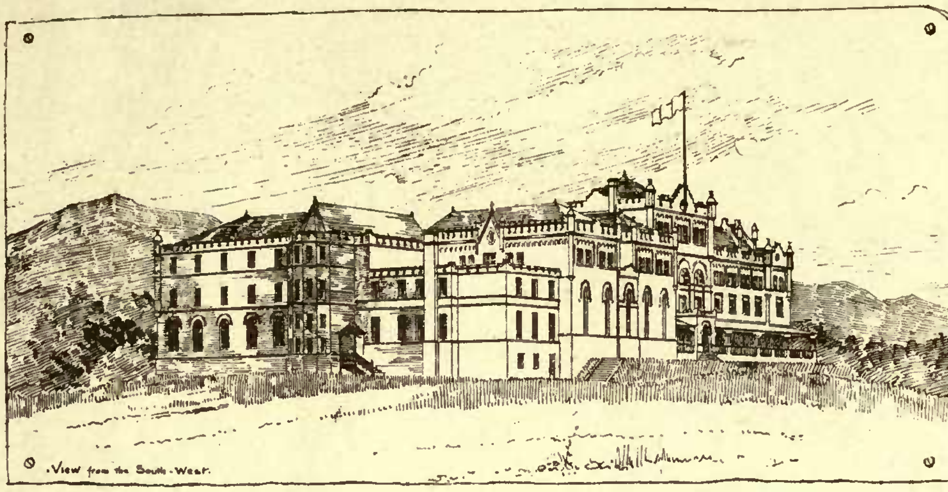
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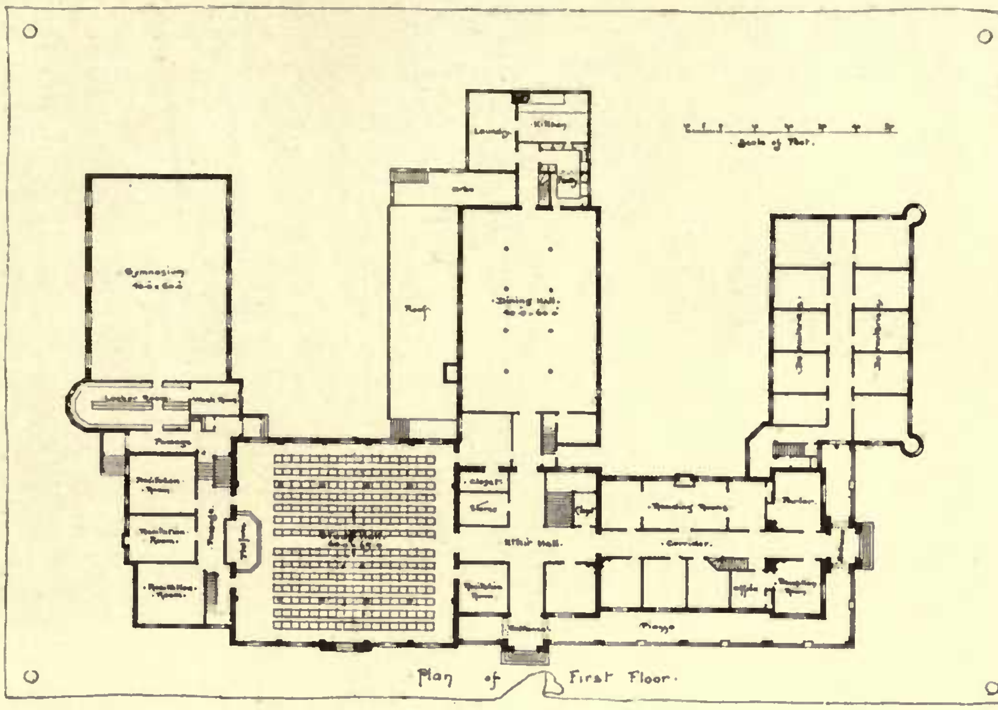




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LIBERTY, VA.

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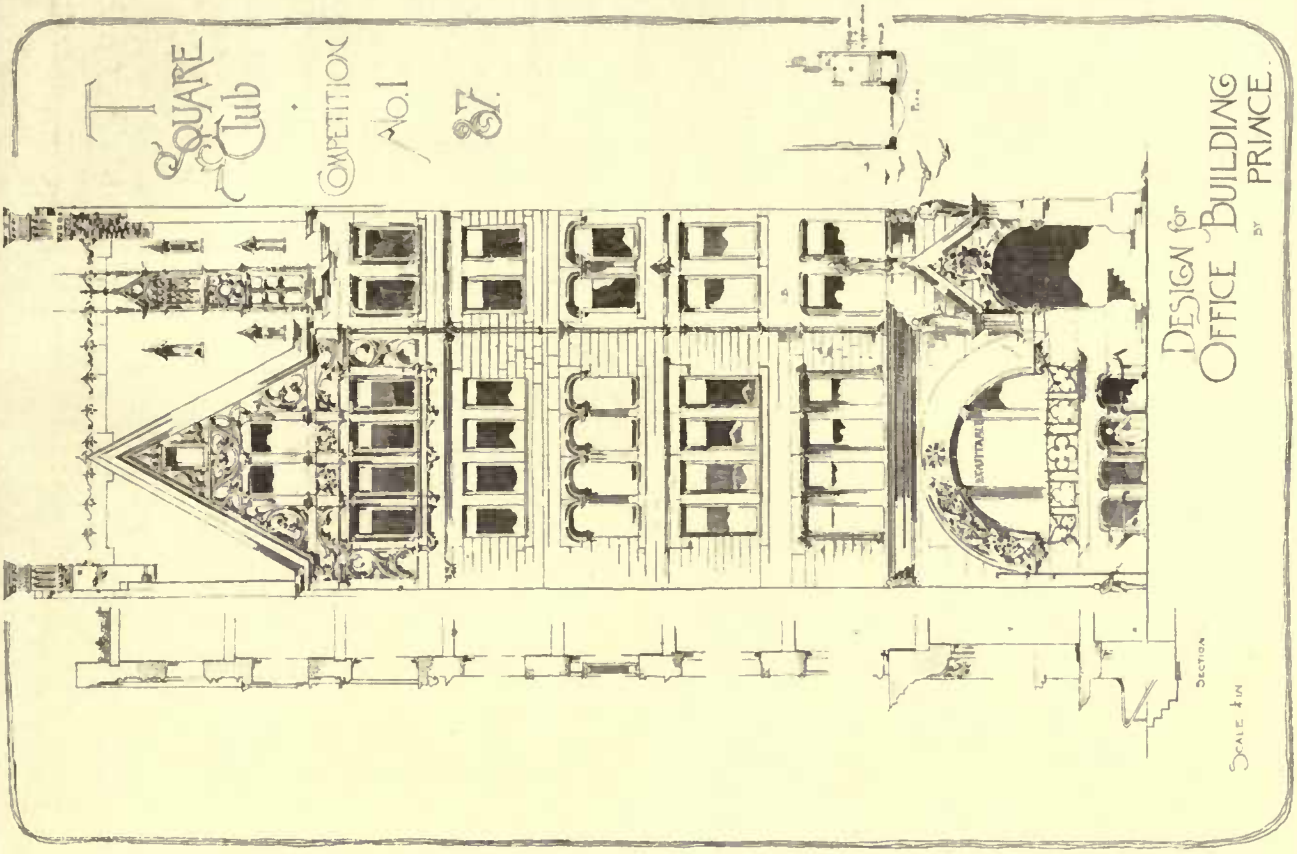


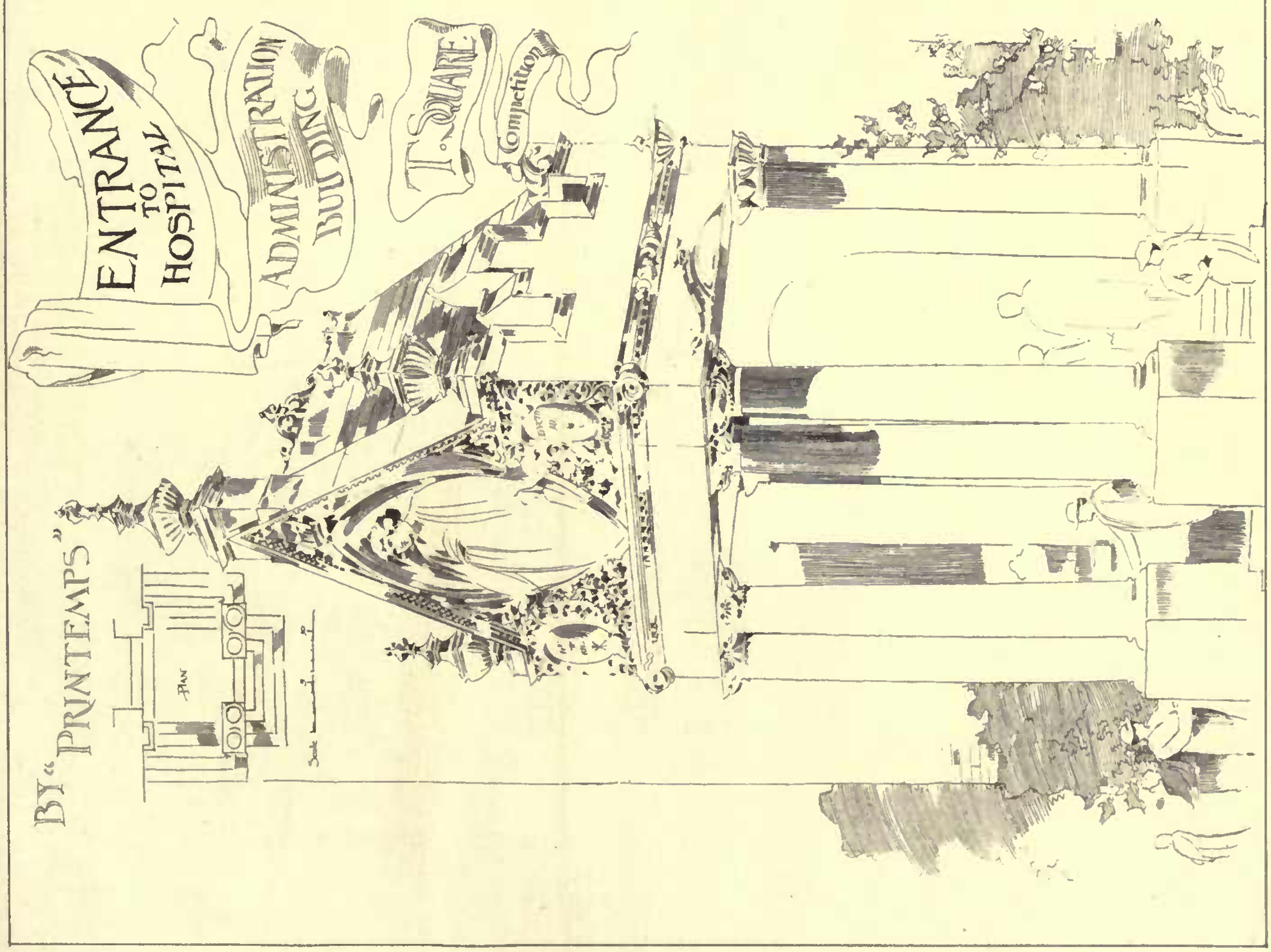
Plan of First Floor.



DEMY.

HELIOTYPE PRINTING CO. BOSTON.





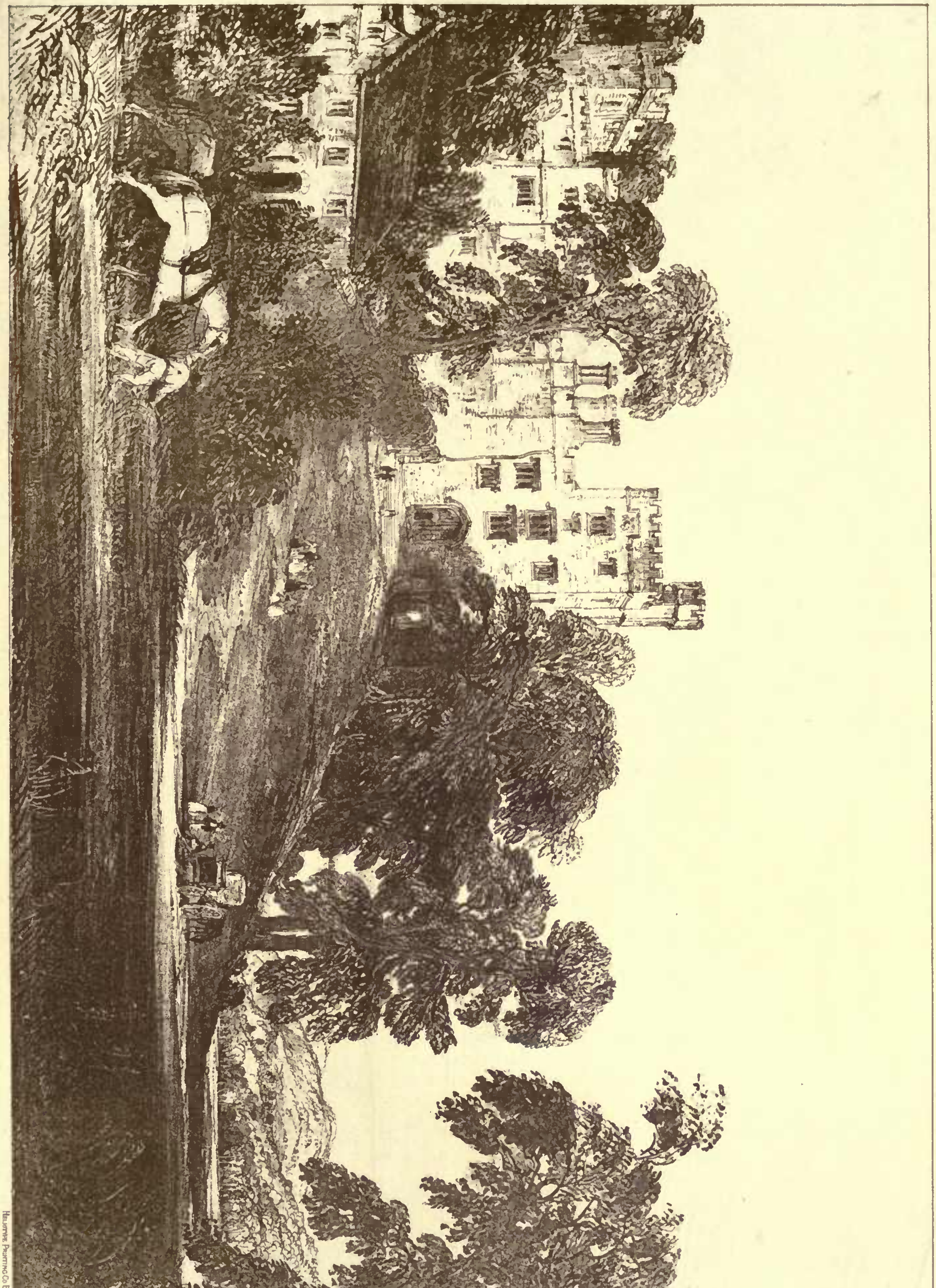
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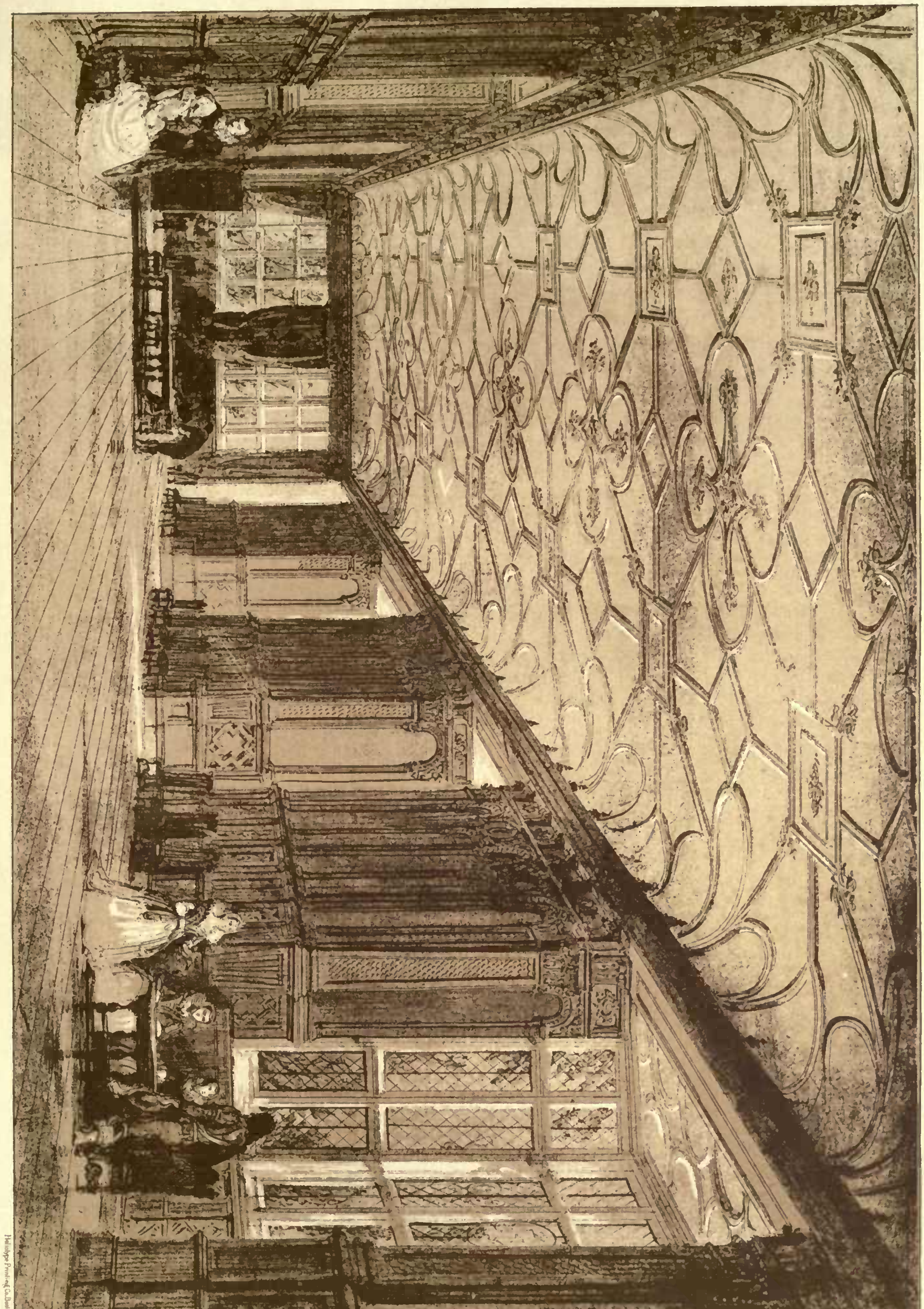
· Presbyterian Church · Liberty · Mo. ·

· Willis Polk ~ Architect ·

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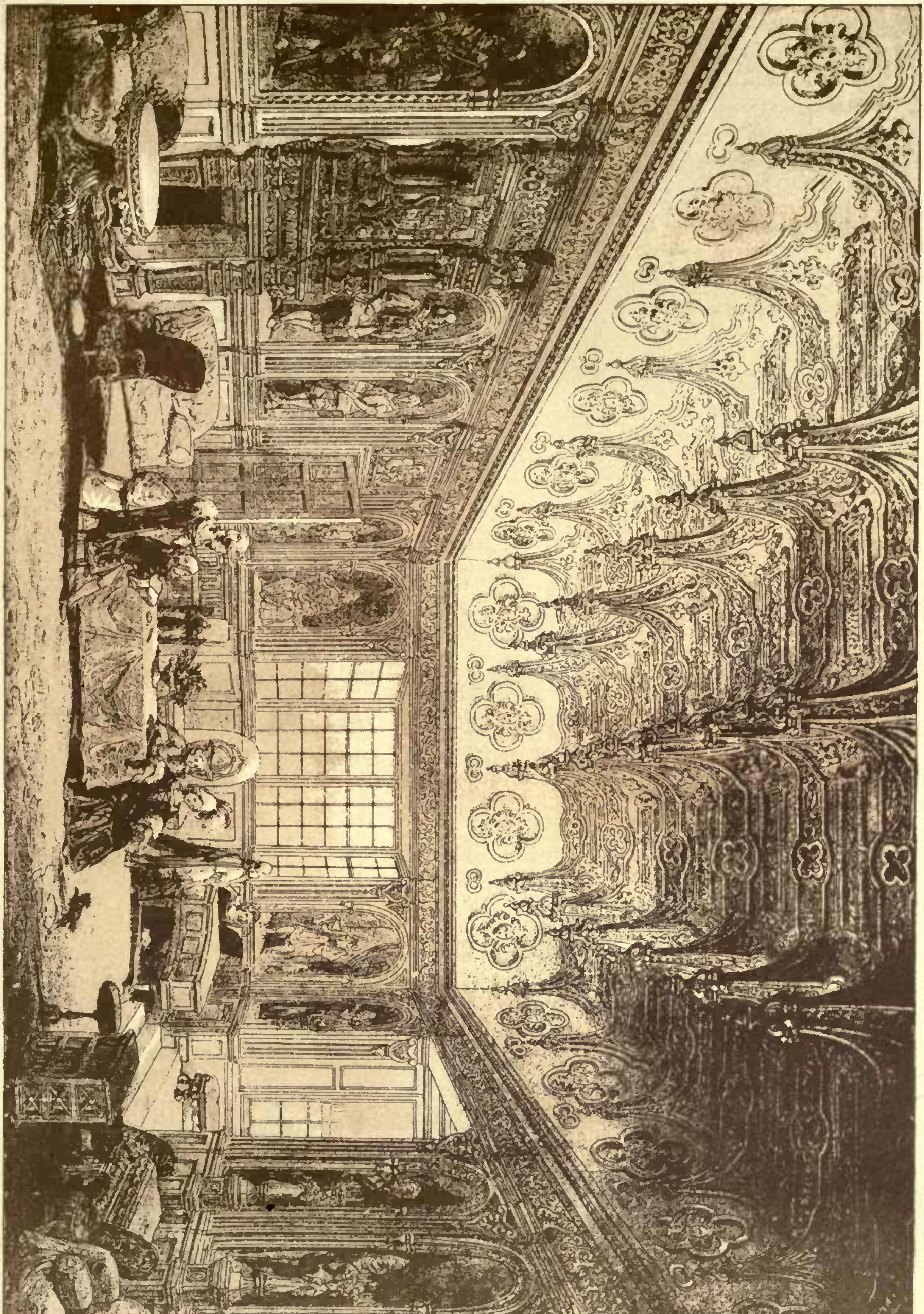


HADDON HALL, DERBYSHIRE



THE LONG GALLERY, HADDON HALL.

Heliotype Printing Co. Boston

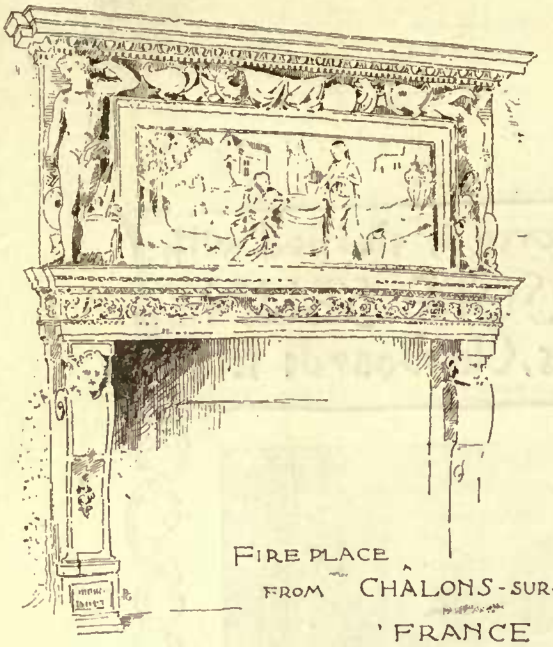


AUDLEY END, ESSEX.

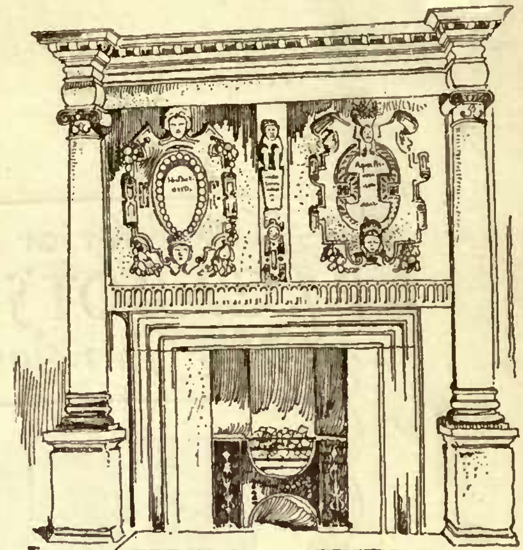


HOUSE OF GEORGE J. McGOURKEY, ESQ., 8 EAST 86th STREET, NEW YORK, N. Y.

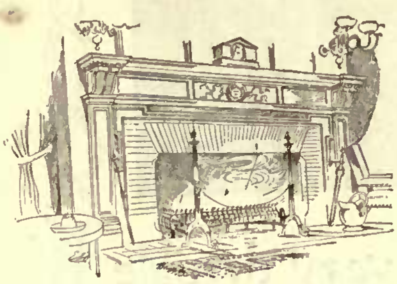
JOHN M. DUNCAN, Architect.



FIRE PLACE FROM CHÂLONS-SUR-MARNE FRANCE

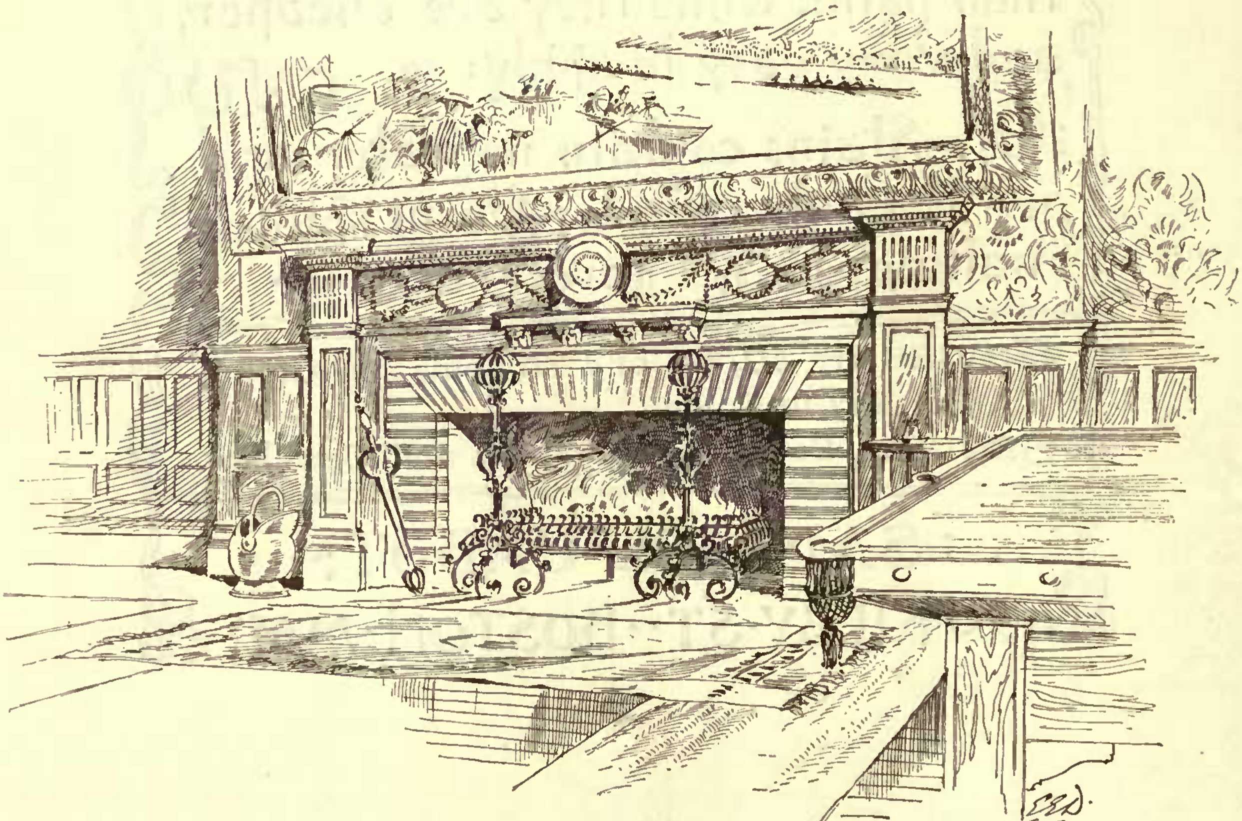


MANTEL, WRAXALL MANOR. ENG.
AFTER THE BUILDER



Morning Room, Boston Athletic Associaton.





Billiard Room, Boston Athletic Association.

FIREPLACES.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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AUGUST 31, 1889.

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THE New York *Times* publishes a long and earnest editorial about the new Municipal Court Building for that city, expressing the opinion that a building erected in accordance with the selected design will be "discreditable to the city and to the Commissioners who authorized its selection"; that the idea of matching the architects against each other to see who would do it for the smallest percentage on the cost put the city in an "undignified and ridiculous position," and that the best way would be to appoint a new jury, of real experts, to examine all the designs over again, and, if it should find that the one selected was really the best, to get up a new competition, which should attract men capable of making better ones. Of course, it is very unlikely that this advice will be followed, particularly as the Commissioners have already bound the city to the architects whom they have selected by a contract which it would be a costly and difficult undertaking to break; and we cannot but regret that the *Times* should not have expressed its very judicious views before, not after, the competition was decided. If a few daily papers, so able and influential as the *Times*, would come to the aid of the technical press in helping people to understand, before important competitions, the conditions which all architects of character consider essential to a fair contest, and the reasonableness and moderation of these requirements, the disgusts, disappointments and losses which attend nearly every public competition might be saved. The conditions are very simple. Nothing more is needed than to engage that the work shall be carried out, or, if not, that a suitable compensation shall be paid the architect selected for the first place; that if it is carried out, the author of the most meritorious design shall be employed to execute it at the customary commission of five per cent on the cost; that the award shall be made under the advice of one or more architects known to the profession as competent judges, and that time enough shall be allowed for men actively employed in other work to prepare, and carefully study, drawings, the nature of which shall be exactly stated in the programme. The original invitation of the Sinking Fund Commissioners allowed a very short time, about seven weeks, we think, for the preparation of a design which could not be properly studied under about as many months by an architect in ordinary practice, and no promise was made that experts would be employed to pass upon the merits of the designs. The consequence was that most architects of standing, after reading the programme, threw it into the waste-basket, where the programmes of public competitions generally go in good offices, and for the same reasons; and the field was left, as it usually is, to the few people who are willing to do themselves the injustice of getting up a crude, hasty sketch, and committing it to fortune, without any assurance that it will be fairly judged.

THE Soldiers' and Sailors' Monument at Buffalo, which was designed by Mr. George Keller, of Hartford, after a peculiar competition which some of our readers will remember, and erected under the supervision of Mr. Beebe, of Buffalo, has been found to lean badly, and an examination by expert architects and masons has shown that the foundation, which is said to be of small stones, in mortar of rather inferior quality, has given way. Of course, there is nothing to be done except to take the whole affair down, and re-erect it upon a proper foundation, and a contract has already been made for this work. Naturally, there is a certain amount of dissatisfaction among the persons interested at having to spend five or six thousand dollars in repairing damage caused by the original failure to put two or three hundred dollars in the proper place, but no one seems to know who is to blame. As usual in such cases, the most conspicuous person concerned, Mr. Keller, who was the author of the design, is the one most violently attacked, although he had nothing to do with its execution, and everything indicates that the trouble is not due to any defect in the plans. Fortunately, some of the Park Commissioners are fair enough to say that they themselves furnished the foundation; that if it had been built of proper materials it would have been strong enough, and that they supposed it was so built, but experience shows that people forget such explanations, and that in the end the reputation of the original architect, however innocent he may be, is almost sure to suffer.

TWO petitions have been presented to the Governor of New York for the pardon of Charles A. Buddensiek, who was sentenced four years ago to a term of ten years in the State Prison on a charge of manslaughter, as having been responsible for the work done in a block of houses in New York, which fell, through the washing out of the bad mortar from the poor foundations, during a very heavy rain. The petitions set forth that his punishment has already been severe enough to subserve the ends of justice, and that no harm can be done by showing mercy to an old and feeble man, who, whatever other people may have thought of his methods of building, showed his own faith in them by being the last to leave the falling houses. While we rarely like to see the arbitrary pardoning power of governors and presidents exercised, we are disposed to think that in this case it might be used to reduce to more suitable limits a punishment which may very possibly have been inflicted with too much regard to the popular feeling against Buddensiek, which was shown at the trial, and was, as usual, promoted to the utmost by the newspapers. No doubt, Buddensiek was one of the worst of the "skin" builders, and seems to have interfered directly whenever he could to cheapen material, and save labor, but he was not a mechanic, and would therefore realize much less fully than an experienced builder the danger involved in following his directions. Moreover, bad as the work done under his direction was, most architects and mechanics have seen worse work than any of his done with impunity, while there are few of the best builders who do not every day run the risk of having their buildings fall, and crush their occupants, through the carelessness, ignorance, or, too often, the malicious mischievousness of the men who work for them. It would be hard, even in the case of a master like Buddensiek, to apportion the blame fairly between him and his men, some of whom probably added improvements of their own to the "skin" system which he taught, and if, not four years, but four months in prison could be dealt out with certainty to all, masters and men, who knowingly did bad work in masonry, plumbing or carpentry, the practice of jerry building would come to an immediate end.

WE must once more call attention to the matter of the publication of Pfeiffer's "*American Mansions*," which we have undertaken in the interests of the late Mr. Pfeiffer's family. The work is issued in parts at the too moderate price of one dollar per part — the price being made low in the seemingly mistaken belief that it would cause a large number of his fellow architects to join in the movement. Three parts are now delivered, and we desire to call the attention of intending subscribers to the fact that on the completion of the work the price will be raised to ten dollars. Until that time, — the middle of September, — subscriptions will be received, as heretofore, at five dollars.

THE competition of 1889 for the Prize of Rome at the French School of Fine Arts has ended in an unusual fiasco, the jury having decided, after much deliberation, that it is not justified in awarding the prize to any one. The second place is given to M. Despradelle, pupil of M. Pascal, the third to M. Morice, pupil of M. Blondel, and a mention is given to M. Demerlé, pupil of M. Ginain. The subject assigned for competition was a very difficult one, a sea-bathing establishment on the Mediterranean shore, between Marseilles and Nice. There were ten competitors, from the best *ateliers* in Paris, but no one seems to have found the fortunate inspiration for successful work. The result will be a great disappointment, not only for the competitors who will have to wait another year, but for the members of the younger classes, who will see their own possible promotion delayed.

THE discussion upon the merits of the system of instruction pursued at the School of Fine Arts in Paris, which was begun at the International Congress, and somewhat abruptly terminated by a vote to refer to the next Congress, after it had become so lively as to endanger the harmony of the meeting, has been continued in the technical journals, with admirable decorum, but with an earnestness which shows, in a way almost touching, how deeply attached the French architects are to their great school. It must be confessed, we think, that, so far, the defenders of the school have had by far the best of the argument. The opposite party seems to find nothing better to bring forward than variations on the stock grievances which Viollet-le-Duc, M. de Baudot, and M. Paul Goût have made so familiar, that nothing but Classical and Italian Renaissance models are used there; that no attention is paid to modern requirements and materials, and that the system of design taught is "illogical;" and the illustrations by which it seeks to enforce its points are anything but convincing. M. Jourdain, for example, in a recent number of *L'Architecture*, complains that when he was at the school, the libraries of the *ateliers* contained absolutely no treatises upon Indian, Chinese or Arabian architecture, and nothing about the Mediæval and Romanesque except Gailhabaud's comprehensive book. This, he thinks, was a great deprivation, for, he says, there are, in Egypt, in Persia, in India, in China and in Cambodia, immense buildings, overflowing with richness, "the admirable creations of artists who never wore off the edges of their ruling-pens at the School of Fine Arts." Even in France, he says, are buildings of the early Renaissance which are full of beauties, and he asks why persons whose temperament inclines them toward the mediæval or the Romanesque should be compelled, like the travellers on the bed of Procrustes, to fit themselves, by stretching or amputation, to the patterns of Greece and Rome.

OF course, all this sounds well to the outsider, and the cry of monopoly, which is directed at the School, seems at first sight to have a certain foundation; but architects, particularly those who have had experience with pupils, hardly need have the fallacies contained in it pointed out to them. The ordinary, let us perhaps say, Philistine mind, cannot see why the young architect should not be permitted to lay in a stock of Chinese and Cambodian and Buddhist *motifs*, in case he should have a call for them, and resents the idea of restricting the student to one or two styles; while students themselves, particularly those who imagine that incapacity for learning the Classic proportions implies a special aptitude for "Gothic" design, are very apt, after spending about four weeks on the rudiments of the art, to make the same outcry against the "monopoly" which prevents them from inventing a new style with every design they make; but the clamor of people who know absolutely nothing of the subject, even joined with the arguments of persons better instructed, but of confessedly eccentric taste, ought not to weigh much against the experience of centuries of the most successful teaching in the world. Even supposing M. Jourdain and M. Goût to be serious in their admiration of Cambodian or Hindoo architecture, it would be preposterous to teach it in a civilized school of art. The critics of the school of architecture would not find much encouragement in an effort to introduce the study of Chinese melody in the musical department of the School of Fine Arts, or to mix a lot of barbaric Buddha figures with the Greek and Roman statues in the Louvre, as a protest against the "monopoly" by the latter of the attention of the young sculptors who frequent the galleries; yet there would be just as much reason for these innovations as for adding the study of the corresponding styles of building to the curriculum in architecture. The idea which seems to run in the head of the adversaries of the school, that an artistic education consists in the acquisition of "a full line" of architectural patterns, to suit the taste of all customers, is, fortunately, less likely to prevail in France than anywhere else in the world, and we may confidently predict that it will be a long time before instruction in architecture at the School of Fine Arts is based on anything else than the purest and noblest models of the art which the world has yet seen, namely, the constructions of the Greeks and Romans, and the Italians of the Renaissance. As to the complaint that the graduates of the school know nothing of "modern requirements," it ought to be sufficient to say, as the Frenchmen do, that the Exposition buildings which M. de Baudot and his friends point to as the embodiment of modernism in design and construction, have, almost without exception, been designed and carried out by graduates of the school, who have not found their imagination seriously wrenched, or their brains overtaxed, in devising beautiful structures of iron and glass, differing from any classical model, in which the "modern requirements" of drainage, lighting and ventilation have been perfectly and logically met.

AMONG the American pieces of construction which *La Semaine* most admires is the sliding-door, which, it need hardly be said, is almost universal here, but little used abroad. Curiously enough, the writer of the article seems to know the American sliding-door only from description, and from an imperfect description at that, for he finishes his account of it by saying that "if it could be arranged to slide in the thickness of the wall, instead of outside, it would be perfect, but perhaps this may come in due time." Architects in America, where not one sliding-door in a thousand, in dwelling-houses, slides anywhere else than in the thickness of the wall, will hardly comprehend their French brother's remark. Not only is a door which slides outside the wall never seen with us except in a stable, but in hundreds of cases double sets of doors, or window-shutters, and even sashes are contrived to slide upward, downward or sideways within the thickness of the walls. How skilfully they are hung with us, so as to move almost with a touch, we need not say; this part of the matter belongs to the province of hardware and mechanical contrivance, in which we may indeed claim a certain superiority. Whether the houses in this country are beautiful or not, we can fairly say that nowhere else in the world is it common for modest citizens to live in dwellings which are maintained all winter long, by an automatic electrical governor, acting on the steam or hot-water apparatus, at a given temperature, which can be changed at pleasure by a turn of a screw beside a thermometer; where the open fires in the grates, if needed for the sake of cheerfulness, are kindled or extinguished by a turn of a knob in the mantel; where a touch of a button in the parlor lights the gas in any desired room, or in the garden or stable, unlocks or locks the front door, brings instant information whether the basement doors and windows are securely fastened, or summons a carriage, a policeman or a fire-engine, as exigency may require; where the mistress of the house travels over it in an elevator moved by water power, and, after communicating with all her servants, without seeing any of them, brings, by the pressure of a finger, the hydraulic dumb-waiter from the kitchen or the laundry, to see if her orders are obeyed.

BUILDERS' HARDWARE.[1] — XXXII.



Fig. 489.

3. ENOCH ROBINSON. Figure 484 is a cut-glass knob set in a fluted, cup-shaped shank, with a simple Queen Anne escutcheon-plate. Knobs of this material are more commonly attached so as to show glass on all sides. Figures 485 and 486 show two varieties of plain, rectangular escutcheon-plates which are used a great deal by some architects and are always satisfactory. The knob of Figure 486 is well designed, in that the shape is suited to the purpose, the few mouldings simply used to give lines rather than detail, and the rows of beads are just sufficient to add a sparkle to the whole. Generally, the hardware manufacturer will put too much work on a knob, rather than too little. It is so easy to add leaf work or convolutions or tortured detail which passes for richness that simplicity seldom finds expression in that which dealers are most apt to put forward as artistic hardware.

The knobs shown by Figures 487 and 488 are great favorites about Boston, especially the former, which in various slight modifications is assumed to be peculiarly adapted to white paint and colonial finish. These are often used to advantage with perfectly plain, rectangular escutcheons. The plates shown here are a trifle heavy for domestic work, especially Figure 488, which is more suited to a public building.

Figures 489 and 491 illustrate two elaborate designs which were made on a special order, goods of this description being seldom kept in stock. The work is excellent in detail, though there is less purity of style than one would expect in so ambitious an attempt. Figure 489 is arranged very daintily, but with a little flatter treatment, less relief to the foliage, perhaps, and a mask which would be less literal in its modelling, this design could be rendered much more charming. Figure 491 is for a front-door, and naturally calls for a bolder treatment than Figure 489. The knob of Figure 491 [not shown] is not altogether successful. A plainer knob, such as Figure 486, for instance, would show to far better advantage by contrast with the rich detail of the escutcheon plate. The knob belonging to Figure 489 is a very common and serviceable form — not one, however, which was especially designed to match the plate.

Figure 490 is a variation on the twisted-knob pattern, with an oval form and bevelled cuts instead of flutings, giving a prismatic effect to the surface.

Figures 491 to 493, inclusive, illustrate some pieces of hardware which can hardly be classed with house-fittings. Every one is familiar with the delightful old mahogany furniture of the early part of this century, ornamented with brass rosettes and wreaths, contrasted with plain surfaces and large, swelling mouldings. This style of the First Empire is beginning to be appreciated again, and the pieces shown by the figures are intended to be used in connection with such work. The patterns are all copied directly from old French furniture, and for the purpose are artistic and very effective. Only rarely can the architect use such pieces as these, but it is easy to imagine a room carried out in the Empire style, with ornaments of this sort used not only on the furniture, but also on the doors and along the architraves, and with charming effect.

Robinson carries a comparatively small stock, his business being very largely on orders, with a great deal of fine hand-work. His goods are thought very highly of by the Boston architects.

4. The Hopkins & Dickinson Manufacturing Company manufacture an escutcheon-plate on a little different scheme from any which have been previously considered, the design being simply a flat piece of metal cut or stamped in an open pattern, the only ornamentation aside from the form, being in the shape of large nail-heads, which are studded about the plate. This sort of design can be made very effective in a great variety of forms. They also make a door-handle, with thumb-latch — a rococo design which is very prettily worked out. Figure 494 is an example of a good effect obtained by the judicious use of a minimum amount of ornamentation: the convoluted pattern on the knob is enough to add life and interest without marring the simple shape, and just a few touches of the same pattern at the corners of the plate and single dots on the key-hole cover are enough to consistently carry out the design and intensify the simplicity. Whoever designed this pattern knew just where to stop, a rare qualification nowadays. This piece is executed in bronze of a clear, old brass color.



Fig. 491.

Figure 495 is a design in oxidized-silver, with some excellent detail, notably the mask or grotesque at the top and the arabesque on the face of the knob. The shape of the knob might be better if it were more spherical. So flat a form looks well in elevation, but does not appear to advantage in perspective. Even the other extreme of an elongated sphere, Figure 496, is preferable in some respects, though this form seems to call for a rectangular escutcheon, rather than the cut plate which is shown with it.

Figure 497 is a variation of a familiar design which has already been illustrated in other makes, and is always pleasing. Figure 498 is a neat arrangement in which rope moulding is used with good effect; and another sample shows a very pleasing knob, not unlike that of Figure 494, set on a plain bronze plate, relieved only by slight, open cuttings at top and bottom.

Figures 499 to 503 inclusive illustrate a few miscellaneous forms which speak for themselves. The hinge and the escutcheon are in oxidized-silver, the others in bronze.

The Hopkins & Dickinson Manufacturing Company bears an excellent reputation in the hardware trade, turning out a very satisfactory class of goods with clean, sharp castings and effective chased work, special care also being given to the colors of the metal, and with exceptional results.

The four manufacturers whose hardware has been illustrated are considered among the best in the country, and, given the same design, one would do quite as good work as the other. Mechanical excellence has been carried to a pitch where there is no difficulty in having the work done well. The great lack always is in ideas, and these are supplied only by careful, intelligent study on the part of the designers, and an appreciation of artistic work on the part of those who purchase and use the hardware; and it is quite possible that any deficiency in the æsthetic quality of our modern hardware may be due as much to lack of appreciation as to any lack of proper artists. But it must not be supposed that these are the only manufacturers who are capable of turning out good hardware. The illustrations may be considered as general rather than special, and as showing the possibilities of not only the four firms named, but of the majority of the hardware manufacturers.

[To be continued.]

[1] Continued from No. 712, page 71.

FOREIGN *vs.* AMERICAN MECHANICS. — The Paris correspondent of a representative American mechanical paper writes, as the result of his observations at the Exposition: "It appears to me that we are laying too much stress upon the superior intelligence of American mechanics. The European mechanic is not the stupid fellow we have pictured him as being. I have talked with Alsace and Belgian mechanics, being referred to them because they could and the exhibitor could not speak English — mechanics engaged in erecting machinery at the Exposition — and found them men of excellent intelligence, and having a good deal of knowledge of mechanical matters. All our traditions are against this, but traditions sometimes falsify facts. In mechanics' tools, however — squares, standard scales, verniers, micrometers and the like — I have seen nothing that appears to me as good as those of American manufacture. These American tools look better, are cleaner cut and more convenient. In wood-working machinery I think we excel at the Exposition. Our machinery appears to do better work, and to do it more completely; that is, it leaves less work to be done by hand. I have, however, never seen better castings than most of those in the European machinery. In general appearance the castings made on the continent indicate that the moulder does not use the trowel and sleek as much as the American moulder. Perhaps he has better patterns to work from. In steel castings Europe appears to be ahead of us in the matter of producing sound work." — *Exchange.*

AN ARCHITECTURAL KNOCKABOUT.[1]—VII.



MY time being limited, I resolved after my stay in Paris to see more of Southern France before going to England on my way home. So I started for Gien, where I sketched that beautiful bit of Rennaissance — le Palais de Justice. Here I had a fine time. I have always made it my aim to be as polite as possible to the natives, and this, I must acknowledge, for a great many politic reasons. They appreciate kindness, and usually return two-fold of that article for what they receive. Here at Gien I had an example of it. Gien is a queer little place, with a splendid château on a very great eminence, and a funny little farm-house hostelry, with a café directly opposite it. It was in the evening; I had finished my dinner and then went over to this café to get my after-dinner coffee. I had caught a cold and was feeling rather melancholy. Soon the pleasant-faced proprietor came and asked me kindly what I was doing in Gien. I replied that I was an American architect, making some little sketches in la belle France, and, having heard of the beautiful town of Gien, came hither. This had its effect, and I showed him my sketches. If there is anything these hospitable French countrymen enjoy, it is simple art. He thereupon called up Jean and Jacques, and many others to enjoy them with him. I was a great lion for the time being, and answered all their questions, as a great lion should. "Was it like photography? and could I sketch anything I chose? Could I take the house opposite?" "Yes," I said, "I can try to do all these things;" and to amuse them I made a rapid little drawing of my old hotel. This was passed around by admiring hands. About this time in came the proprietor's wife with her child in her arms — a buxom lass she was — who also became very much interested. I



asked her to keep still a moment; she blushed deeply and complied. I made a rapid sketch of her and her baby in color, which came out very decently. I presented it to the happy father, amid the plaudits of my amiable audience. My cold was quite troublesome, and soon after the crowd of men retired the proprietor came to me with a great bowl of some French decoction known as "*groc.*" He said the gentlemen had sent it over, wishing Monsieur to drink it immediately and go to bed, and that his cold would be gone in the morning. I thanked them warmly, knowing that if one does not accept proffered kindnesses of this sort, it occasions disappointment. The proprietor enquired when I was to leave; I told him, the next morning, for Nismes. I found out, to my chagrin, that I would have to walk across country nearly a mile in order to catch the "bus" for the station. Gien is two miles from its railroad terminus.

The next morning I awoke feeling like a lion — of a different breed from the one of the evening before — after a refreshing sleep. My breakfast was ready for me, with many things I had not ordered. I made arrangements to have my baggage ready for my walk to the bus crossing. I then asked for my bill, and was more than surprised when I was informed that it was settled, and told that the gentlemen hoped I would take it as a compliment from them. Goodness! this was indeed delightful. In going to the door a new surprise awaited me. There was my baggage nicely stowed away in a tumbrel cart, and two or three of my new friends (gotten up in their best with ribbons and frills) had come to take me to the station. You have no idea how this unexpected attention touched me. I accepted it with heartfelt thanks; and when we parted at the station, it was with difficulty that I could express to them my appreciation of their kindness. Their great bronzed faces became strangely quiet as they shook hands with me. — I shall never forget Gien nor its people. Some day I'll go back there, and they'll remember me too.

I went to Nismes to see the great amphitheatre. To Avignon and Tarascon, and at last decided to go to Arles. Here I knew there was still another amphitheatre. At each of these visitations I had been told the same tale of how "the Romans with thirty thousand troops cleaned the town." At each repetition it was necessary to fee the guide, a process which became both monotonous and expensive, and I resolved that nothing would tempt me to listen to these impudent guides again. I reached Arles on Sunday, when I knew that the common people would be sure to wear their native costumes, so that my visit there promised me some artistic enjoyment in the way of picturesque color.

At the station the first thing I saw was a notice to the effect that two murders had been committed the night before, and all strange and foreign characters were to be looked after carefully. This was a pleasant sort of an item to welcome a lonely traveller indeed! The beautiful old ruin, wonderfully preserved, faced the street up which I went. Crowds of men and women, with more than the ordinary accompaniment of the military sprinkled among them, were promenading up and down the avenue, which was lined with innumerable cafés. The women were most of them good looking, wearing headdresses of black lace or handkerchiefs and red and black skirts. They were evidently enjoying themselves, as they were all talking at the same time on the gay boulevard. I resolved to see the plan of the amphitheatre, out of curiosity, dispensing with the troublesome services of the inevitable guide with the same old story of the "thirty thousand Romans." On entering I saw a notice saying that "travellers will please not fee the guide as he is a Government official and derives his income therefrom." This was conclusive, and with the law on my side nothing should alter my determination. So leaning against a great column I took in the grand old oval. It was much the same as the others I had seen, but this was by far the best preserved. Soon a smooth-faced, keen-eyed, lanky guide came sidling up to me and asked if "Monsieur would like to have the place explained."

"Monsieur would not," I replied.

He then said, "What, not have it told him how thirty thousand Roman troops came and cleaned the town ——."

"No," I said. "No."

"and the lions ate ——."

I said "No."

"Ah! well if Monsieur will listen and see if he has good ears, I will go to the farther end of the amphitheatre and snap these two coins together. Note the wonderful acoustics of the place?" I had no time to stop him, and on his return and in answer to his question of how many times he had snapped them together, I replied, "Eight times." This seemed satisfactory to him. I then started to go out, but he insisted upon my buying some photographs. Upon my refusal, he got very angry and demanded a "fee." "What for?" I asked. "For showing you the place," he answered. He was all the time getting more and more angry, and to save a row I handed him fifty centimes. Holding it out in the palm of his hand he said sneeringly. "What's that?" "Well," I said getting angry in my turn, "it's a big lot more than you deserve." Whereupon he remarked that he wished two francs from a gentleman like me. An English gentleman, too. I informed him that I was not an English gentleman, and said, "Well, give it back to me." This he did, undoubtedly thinking that I would give him the amount he had demanded; but I deliberately put the half-franc piece back into my pocket. He became simply frantic, and shrieked out that I should n't get out of the amphitheatre till I had paid his fee. "We differed," and he started to run towards the gate, and I after him.

At the end of a passageway, which was the main entrance to the ruin, was a great iron gate for the purpose of keeping out the people when the place was used for bull-fights, as it was in summer. Just as I was passing him at this point, both rushing madly for the gate, he stopped and put his elbow up sharply catching me under the chin, making me bite my tongue terribly. The pain was maddening, and yelling to him to open the door, I sprang at him, upon his refusal, and sat him down on the cold floor easily and tore open the door and emerged into the street endeavoring to compose myself to appear as if nothing had happened. Out he came after me yelling at the top of his lungs, "*Canaille d' Anglais!*" "*Espèce de singe!*" and a few other choice bits. The situation was far from pleasant.

[1] Continued from page 90, No. 713.

Crowds immediately came around us, and then awful thoughts came to me as two gens d'armes caught me by the collar. My irate friend commenced to condemn me, by saying that I was a dog of an Englishman, and had made him show me all over the place and gave him not a sou, and also that I had dared to lay hands on him. I



I address the Populace.

essayed to speak but was stopped till he got through, I then composed myself as well as I could and resolved on bold action. The women, I knew, ruled the town completely, at least I had heard so, and it is by far an easier task to talk to women than to men. So I commenced my defense, after having heard one or two women who were crowding around say pityingly, "*Pauvre garçon noir.*" This was encouraging, so I delivered the following in my best French, very slowly and very much to the point: "*Attendez:*" I said: "I'm not a dog Englishman, but a free-born American, like all of you in the Republic of la belle France [I kept saying la belle France over and over again.] I came here as a young architect sketching the beautiful wonders of la belle France, [Here the grip of the gens d'armes on my collar sensibly lessened] and also to see [bowing] the *lovely women* of Arles of whom we, in America, have heard so much. [Here the grip on my collar left it entirely.] I did not ask this man's guidance.



Comfort at last.

He tried to make me give him money; tried to make me buy photographs, and I gave him fifty centimes. This he threw in my face, and started to lock me in the amphitheatre! Think of it! After first having struck me — Mesdames! Messieurs! I, a free-born American, from America, to whom you gave the beautiful Bartholdi statue, [yells of approval] which I see every morning from my chamber [I, living in Boston] I ask you, could you stand it [No! No!] in la belle France?" This seemed to have an immediate effect — with a whoop, all the crowd pounced on the poor unfortunate scamp and hustled him away — the women kicking him and slapping his face. This was a complete victory for me, so knowing I must do something in return for this gratifying and unexpected result, I invited those of the women who had rendered me the most efficient services and politely conducted them, on each arm, to a café, where, as we students say, I "blew them all off" to coffee. I was the greatest man in Arles that day, but I left town by the afternoon train just the same, my regard for the female proportion of the French people being very high.



Good-bye, Europe.

Leaving Arles I journeyed to Marseilles along the Riviera, to Cannes, Nice and Monte Carlo, where at that wicked kursaal — fascinating place — I made the usual "five-franc dash," and with so much success that I had a big dinner, bought a new hat, priced a yacht and went back to Paris in a first-class compartment.

My time was nearly up. I was very anxious to "have a hack" at England and get to London; so I said good bye to all the good friends I had made during my vagabond travels. Among these were two fine fellows, brothers, from Rochester, young architects, who travelled a long way with me and whose kindness in many ways I shall never forget; and another young architect whose hospitality at Paris and the pleasure of whose company on a little trip I enjoyed most heartily.

Going by Amiens to Dover, I arrived in London, where I stayed three weeks. The weather being very bad I could do but little sight-seeing in town or sketching in the country.

Then embarking for home in the White Star Steamer "*Adriatic.*" I arrived in a most happy "state of states," having many times during my "Knockabout" thought that peradventure I might never see my native land again. So with thanks to all who have been kind to me, and to you, kind readers, for looking this little history over, and to Heaven for keeping me safe through it all, I end these reminiscences. F. L. V. HOPPIN.

ARCHÆOLOGICAL FINDS IN ITALY.



THE excavations being carried on in the Province of Grosseto, just at the place where formerly rose the Etruscan city of Faleria, rendered celebrated by the siege of Camillus and by the treachery of the schoolmaster who proposed to the Roman general to deliver to him the children of the leading nobles of the besieged city. These excavations have brought to light a tomb containing jewels of rare richness and utensils very finely ornamented, amongst others four bracelets and three gold fibulas, an amber collar composed of nude female figurines and squat cynocephali, also a copious assortment of small chased objects, and finally the complete armor of a cavalier: the bracelets presented this peculiarity, that they enclosed several human teeth — a peculiarity which has been met in no other Etruscan tomb. The tombs of Faleria were circular in form, like all those which have been discovered in the same region, and which by this token differ from tombs discovered in other Etruscan cities where they have ordinarily been of the rectangular form. These archæological finds will little by little furnish for students the necessary elements for reconstituting the history of the Etruscan people, whose original and ethnographic characteristics are still uncertain. Hellanicus considers the Etruscan race a derivative from the Pelasgian nation; Herodotus pretends that the Etruscans formed a detached fraction of the Lydian race; and Dionysius of Halicarnassus refutes Hellanicus and Herodotus, and affirms that the inhabitants of Etruria were aborigines. We shall only know the real truth when the Etruscan inscriptions have been deciphered. For the moment we know the alphabet which the people of central Italy used; we know, likewise, a hundred words or so which we often discover on their tombs or under the paintings which ornament some of them; but we have not yet been able to translate consecutively the Etruscan inscriptions which will reveal to us, sooner or later, the secret of the origin of this enlightened and civilized people, whose power probably extended from one end of the peninsula to the other, contrary to the ancient ideas which restricted to the Tuscan region the dominion of the Etruscans. There have been found on the slope of the Adriatic, in upper Italy, in Campagna, and even in Sicily, archæological remains which prove, on the contrary, that this intelligent and refined race was scattered pretty much everywhere. From the standpoint of the history of art, the studies into the history of Etruria will bridge over a regretable break, especially if they will permit us to fix the precise measure in which the invasion of the Greek artists contributed, in the first place, to perfect Etruscan art, and in the second place to determine its corruption and decadence.

There has just been classified at the Museum of the Capitol a piece of Bacchic sculpture, which has recently been found in a nymphæum in the neighborhood of the Porte San Lorenzo, the sculpture representing a gigantomachia. The peculiarity of this important find consists in this, that the two personages who compose the group are finished off as serpents, a development which was quite unexpected when the fragment was unearthed, for the marble was imperfectly cleaned, and it was not possible to clearly distinguish its contours. The serpent formed an integral part of the worship of Bacchus. In the piece of sculpture in question we see a young satyr thrown to the ground, at whose side still stand the serpentine remains which served the conquering giant in place of legs, one of which envelops in its spiral fold the right arm of the dying victim.

The *savants* who interest themselves with archæological questions have all remarked that the satyr presents a striking analogy to the celebrated "Dying Gladiator" in the same museum, not only in the general position of the body, but also in the cut and disposition of

his hair. For a moment it was thought that this fragment formed a portion of a larger composition, and this supposition was strengthened by the fact that in the same locality there had already been found at a little distance two other satyrs conceived in the same style; but a more attentive examination has caused this hypothesis to be laid aside, particularly as the form of the plinth, which is perfectly detached and complete, admits of no presumption that it was accompanied by other statues.

In the same museum has also been placed a marble altar dedicated to the lares of Augustus, found in the region of Arenula, and dating back to the year 756 of Rome. This morsel is in a general way quite well preserved, and has only suffered slight damage in its upper part. The bas-relief on one side represents the libations made to the gods by the worshippers, who are clothed in togas, and have foreheads veiled and crowned with laurel. The priests, likewise crowned with laurel, are present at the ceremony, while the assistants bring the victims to the altar — the bull and hog — the first a sacrifice to the genius of Augustus, and the other to the lares. Upon two sides of the monument are sculptured in relief the figure of a lar. This domestic divinity is presented in the form of a young man holding a branch of laurel in his right hand, and raising in his other hand above his head a symbolical horn. This monument is of rare preciousness, the archæological collections containing only two pieces which can be compared with it. There are known at present only two altars dedicated to the lares of Augustus, one of which is found in the Vatican Museum, and the other in the Museum at Florence. The altar which is in the Vatican was consecrated in the year 747 of Rome, and is ornamented with bas-reliefs on four sides. Here we see on one side two lares and the genius of Cæsar Augustus, with veil and toga, and on the opposite side a crown of oak leaves and two laurel plants. Upon the two other sides are represented the sacrifices. The altar at Florence is of more complicated and finished design. Upon one side we see Augustus clothed with the ordinary attributes, which are the toga and veil, and having at his right a personage who is supposed to be Lucius Cæsar, and at his left his wife Livia, bearing in one hand the patera and in the other a coffer of incense. Between the emperor and Lucius a fowl is pecking something from the ground. The left side is dedicated to a trophy, over which rules an image of Victory. The opposite side contains the images of the lares, and on the rear face is a crown between two laurel plants. The perfect similarity of the symbols and attributes and analogy of the personages leaves no doubt as to the close connection which exists between the three monuments, which, within a few years, date from the same epoch. H. MEREU.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

CHRIST CHURCH CATHEDRAL, MONTREAL, P. Q.

[Gelatine Print, issued only with the Imperial Edition.]

Y. M. C. A. BUILDING, ROCHESTER, N. Y. MESSRS. DUFAIS & CANFIELD, ARCHITECTS, NEW YORK, N. Y.

THIS structure will occupy a frontage of 60 feet on South St. Paul Street, and of 160 feet on Court Street. the main frontage being on St. Paul Street and overlooking the Genesee river. The main entrance is on the St. Paul Street side, and is also the approach to the public staircase and elevator, leading to the office floors above the Association rooms. The main entrance to the music-hall is placed at the centre of the Court Street front, and communicates with a large lobby from which, on either side, staircases lead to the foyers above. The placing of the library below a portion of the gallery of the main hall is a considerable economy of space, besides affording an admirably adapted place for the books, and the device by which the staircase communicating with the various stories of the Association rooms is placed in the same stair-well with the public staircases leading to the upper or office portion of the building, has proved a very important saving of floor-room. The Association will occupy the rooms up to and including the third floor, with the exception of the store on the ground floor. The fourth, fifth and sixth floors will be used for offices or other purposes. From the reception-room opens a leisure-room with a cosy fireplace and seat. Opposite this, on the corner of the building, is the parlor. Next to this, the private office with a fireplace. At one end there are large windows, from which a beautiful view of the Genesee Rapids is had. At the other end, a large archway to the public reading-room and library. Adjoining the office is the coat-room, and next to that the lecture-room, with a seating-capacity for 200. At either end of the reception-room, on the mezzanine floor above, is an arched balustrade with loggias. It will be seen that the office is so arranged as to command a view of all the approaches and egresses. In the basement is the gymnasium, two stories high, which will be fitted up with all the latest and best known appliances. Around the gymnasium is a wide, elevated running-track. Adjoining are the bowling-alleys, the wash-room with shower, needle and sponge baths, and other approved accessories. Off the wash-room is the swimming-bath. Above the rear end of the reading-room, and overlooking it, is the members' reading-room and library, reached by a small staircase — this room being planned from the space between the foyer and gallery of the hall. Two small assembly-rooms, arranged to throw into one if desired, occupy one side of this — the mezzanine floor and a study and gentlemen's toilet-room occupy the other side. This floor is reached by way of the Association staircase from the reception-room, around the elevator, which staircase continues at the rear loggia at the end of the reception-room to the third floor. The third floor contains the Directors' room, a large dining-room with kitchen adjoining, capable, by way of dumb-waiter, of serving all the Association floors, and a ladies' toilet-room, one reading and game room for boys, and two class-rooms. The music-hall has a seating capacity of 1,000 including the gallery. Under the lobby is the bicycle-room entered by way of a separate doorway on the level of the sidewalk. The stage entrance is at the rear end of the building, and is used for the tenants occupying the fourth floor and the janitor's living rooms. The hall will be ventilated by forcing-in moderated air through the auditorium floor, and drawing the foul air out through a shaft in the centre of ceiling which runs to the roof. The building will be constructed of Sayreville, N. J., face brick for the first story and local brick with terra-cotta and copper ornament and mouldings above, enriched around the main entrances. The constructional parts will be constructed on iron columns and girders throughout, and the elevator staircase will be fireproof. The cost of the building and site will be about $150,000, furnished complete.

ARTISTIC HARDWARE, MANUFACTURED BY ENOCH ROBINSON.

ARTISTIC HARDWARE, MANUFACTURED BY HOPKINS & DICKINSON MANUFACTURING CO.

SEE article on "Builders' Hardware," elsewhere in this issue.

NEW YORK ACADEMY OF MEDICINE, NEW YORK, N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

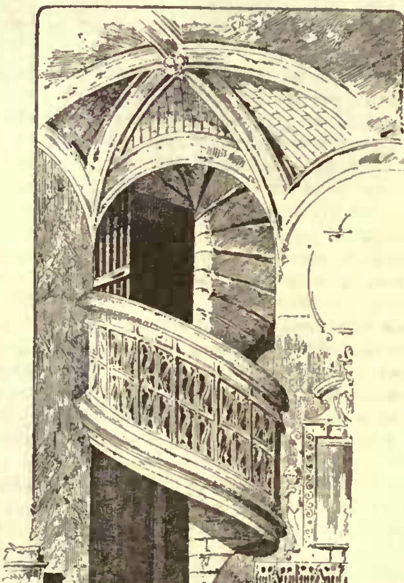
DESIGN FOR A COUNTRY HOUSE. MR. E. H. HAMMOND, ARCHITECT, NEW YORK, N. Y.

ADELPHIC SOCIETY BUILDING, OLIVET, MICH. MESSRS. SCOTT & SON, ARCHITECTS, DETROIT, MICH.

PROPOSED "HOME RANCH," NEAR YORK, PA. MR. FRANK S. MEAD, ARCHITECT, PHILADELPHIA. PA.

HOUSE OF MOSES T. STEVENS, ESQ., NORTH ANDOVER, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

THE REMOVAL OF ROOF-WATER FROM BUILDINGS.



Staircase in the Hotel Cluny, Paris. From *le Moniteur des Architectes.*

MR. DWIGHT PORTER, Ph. B., of the Massachusetts Institute of Technology, recently contributed a paper under the above title to the *Technology Quarterly*, which is of such interest to a large number of our readers that we republish it herewith:

In most cases roof-water will soon take itself off without assistance, but its manner of doing this and the final disposal thus made of the water are not always satisfactory. Dripping eaves projecting over city sidewalks would be an intolerable nuisance; and whether in city or country, rain-water allowed to fall freely from the roof to the ground next the building tends to dampen the cellar foundations and walls and thereby to injure the health of inmates of the building, as well as to harm the structure itself and property contained within. It, therefore, becomes essential to direct the course of water falling upon the roof and to convey it away to a proper point of discharge. To effect these purposes various arrangements have been employed, some of which will be mentioned.

For directing the course of the water, as it is received upon the roof, to a suitable point of discharge, we have gutters. On old-fashioned country houses these were often made from a log of moderate diameter, sawed lengthwise, gouged out, and supported by hooks or brackets under the eaves. In modern construction the gutter is very commonly made angular in cross-section, formed upon a wooden cornice, with a protecting sheathing of tin, galvanized iron or copper. Half-round or angular gutters of these metals are also used, hung at the eaves. Leaders, conductors or rain-spouts, as they are variously termed, receive the discharge from the gutters, and, descending toward the ground, convey the water a stage farther in its journey. The problems connected with rain-leaders are not very intricate, but yet they have not always been well-solved. It is not a difficult matter to arrange a few leaders for receiving the roof-water of a building; but from mistaken economy, or from lack of knowledge or of forethought in the matter, they often prove inefficient when most needed, and are a constant source of trouble and expense. Their size, which is commonly determined by experience and judgment, and not by calculation, ranges in diameter from two to six inches. The two-inch pipes are too small to serve to advantage as main leaders on almost any building, being easily choked; three-inch and four-inch pipes are suitable and common sizes for ordinary dwellings and small commercial buildings. The five-inch and six-inch sizes find employment on large structures.

The Produce Exchange Building, in New York City, with a roof area of three-fourths of an acre, roughly speaking, has twelve leaders of about five inches diameter. The roof, which is paved with fire-brick, is graded with slopes of perhaps one in fifty toward the points at which the leader-openings are placed, most of these draining-surfaces being about 40 x 70 feet each. The provision here made is equivalent to about one square inch of leader-opening to 140 square feet of roof-surface. On the Sloane Building, at Nineteenth Street and Broadway, with a roof area of 18,000 or 20,000 square feet, sloping one in twenty-five, there are two leaders of about six inches diameter, and a third rectangular, 4 x 6 inches. This gives an allowance of 240 square feet of surface to the square inch of leader-opening, while on the Massachusetts Hospital Life Insurance Company's Building and the Hemenway Building, in this city, the proportion is only from sixty to seventy square feet to the square inch of opening.

	Approximate roof surface.	Approximate surface per sq. inch of leader opening.	
Produce Exchange building, New York..................	33,000 sq. ft.	140 sq. ft.	twelve 5-inch leaders
Sloane Building, New York...	19,000 sq. ft.	240 sq. ft.	two 6-inch leaders and one 4 inches x 6 inches
Massachusetts Hospital Insurance Company's building, Boston................	6,000 sq. ft.	70 sq. ft.	seven 4-inch leaders
Hemenway Building, Boston.	4,000 sq. ft.	60 sq. ft.	five 4-inch leaders

Whether a roof slope steeply or gently, there is a certain amount of water falling per second or per minute in storms, which must be removed; but I have learned of no generally recognized rule among architects as to the leader provisions which should be made for it. A vertical rain-leader does not, of course, run full-bore, even in the hardest storms, and if carried down from the roof with its course unbroken by sharp bends, and if given a suitable opening at the top, there is probably little danger of its proving inadequate. It is very common, however, to introduce abrupt changes of direction to suit peculiarities of architecture, by which the carrying-capacity of the pipe is curtailed, and liability of choking by leaves, rubbish and ice is greatly increased. On a business block on Sudbury Street, in this city, may be seen a rain-leader which, within a few feet of the point of leaving the gutter, makes four abrupt and nearly right-angled changes of direction. It will frequently be noticed on buildings, also, that the immediate connection between the gutter and a four-inch leader of ample capacity is effected by a very much smaller pipe of lead.

In connection with important buildings there is perhaps more need of caution in designing the drain of suitable size than in fixing upon the size of leaders. Formerly house-drains were made entirely too large, an error which has come to be recognized and has led to the practice of using comparatively small sizes. These are advantageous for procuring an effective scour of the pipes by the slight flow of ordinary house-drainage, but have in numerous instances proved practically insufficient for managing the volume of water furnished by heavy storms, which is doubtless often hundreds of times as great as that coming from interior house-drainage. In the Sloane Building, to which reference has already been made, I am informed that it was found necessary, on this account, to enlarge the main drain from eight inches diameter to ten inches, considerable damage having been suffered two or three summers ago from a flood of rain-water during a severe storm.

A practical difficulty connected with the delivery of roof-water to the house-drain has also been experienced under certain circumstances, in the apparent carrying along by friction and imprisonment of a large amount of air by the descending column of water, and a consequent pressure on the traps of connecting pipes, and even a serious interference with the flow in the main drain itself, unless relieved by ample venting. An instance was mentioned to the writer by Mr. John C. Collins, Chief Inspector of Plumbing for the New York Board of Health, in which very considerable injury to property resulted in this way, the rain-water bursting out near the bottom of a leader and flooding the basement of a building. The leader ran down the rear of the building, the main part of galvanized-iron, succeeded near the bottom by a cast-iron shoe connecting with the drain. In the drain was a running trap near the foot of the leader and another near the front of the building. Two stacks of waste-pipe and a stack of soil-pipe joined the drain between the traps, and there was near the front of the building the usual four-inch fresh-air inlet. Still, the five-inch drain appeared incapable of serving the leader in heavy rains, and the water would back up ten or twelve feet high in the leader and overflow at the top of the cast-iron shoe. That the trouble was due to the interference of the imprisoned air was indicated by the fact that it was partly relieved by inserting a two-inch air-vent between the leader and the first trap, and entirely overcome by a three-inch vent. Now and then we find the roof-water carried to the street sewer in an independent line of pipe, but the usual and what is generally considered the preferable practice is to conduct it directly into the house-drain, sometimes at the back end, sometimes at the front, just inside the main trap, and again at both these or at intermediate points, according to circumstances.

On a large proportion of city buildings the rain-leaders run down the outside of the walls, but yet in a considerable number they are carried down within the walls, in which case it is evidently desirable that the same care should be taken to prevent the escape of drain or sewer-air through defective material or joints that would be taken with stacks of soil or waste-pipe. Consequently we find in the public regulations in force in large cities requirements that the leaders shall be constructed of iron (in New York copper may also be used) if carried within the walls. In New York City it is permitted that leaders of iron or copper shall be without traps, unless the top is near a window, in which case a trap is required at the base. In Boston, however, all leaders must be trapped in new construction.

The troubles encountered in the practical service of leaders and gutters are occasioned in part by their becoming choked with leaves or rubbish, but principally by their being clogged and burst by accumulations of ice in winter. Leaves and rubbish may be largely excluded from leaders by the use of wire-strainers or iron-gratings, though these, of course, do not prevent accumulations outside and near the tops of the leaders. In the midst of a large city, however, leaves are usually strangers, and in a cold climate the trouble with gutters and leaders comes from ice. It is very common to see a tin or galvanized-iron leader brought from the roof down the face of a building and terminating in an iron "pipe-shoe," as it is called. Such an arrangement will be found on the brick blocks of tenement-houses on Nashua and Billerica Streets, for example, in this city; and walking through these streets it will be noticed that nearly every one of the cast-iron shoes has been split by ice. Leaders often become incased in ice to the size of a barrel, from top to bottom, while from the gutters and eaves depend huge icicles which threaten the heads of passers below. These troubles from ice cannot in all cases be conveniently and entirely avoided; but on important buildings it is perfectly practicable to escape them by proper location of leaders and gutters, by the use of pipes of suitable material and shape, and by supplementary employment, in some cases, of steam.

On steeply-pitched roofs gutters are naturally found at the eaves, either built out or suspended, as has been before mentioned, with leaders running down on the face of the walls. But large business blocks are now very commonly built with tolerably flat roofs, a long slope from front to rear being succeeded by a short rise to the edge of the roof, the V-shaped channel between the two slopes serving as an ample gutter. Sometimes, indeed, as on the Morse and Wilde Estate Buildings, on Washington Street, in this city, the roof is given a slope from both front and rear toward the centre, where the gutter channel is thus formed. In either of these constructions, the gutter being entirely upon the main part of the roof, it is natural and easy to carry down the leader within the building, and where this is done little or no difficulty is experienced from ice. Rain, snow and ice then take care of themselves, and the heat of the building, supposing it to be occupied, is found sufficient in this climate to prevent accumulations within the leader.

MATERIAL OF CONDUCTOR-PIPES.

As has already been said, the regulations in large cities would prescribe for such cases iron or copper-pipes, which, indeed, would naturally be employed. The same materials may be and often are utilized also for outside leaders, but galvanized-iron and tin are far more common. The choice of material is important, chiefly in connection with the lasting qualities of the pipe; the shape of the cross-section and the mode of making the longitudinal seam are important as regards protection against bursting by ice. In some parts of the country zinc was once almost exclusively employed for leaders; in other parts, tin. Tin-pipes are still perhaps the most commonly used, on the whole, of all kinds, on account of cheapness in first cost; but galvanized-iron pipes are considered superior, and being not greatly more expensive than tin are given the preference in good work. Either material, however, is subject to gradual corrosion from the water which comes in contact with it, more rapid corrosion from the moist salt-air along the coast, and still

more rapid corrosion from steam and from sewer-air. In New York City, for instance, there are many leaders having untrapped connection with drain or sewer, and these leaders, whether of tin or of galvanized-iron, are said to withstand corrosion generally but a very few years.

There are two principal varieties of tin in use for roofing and leader purposes: the old-fashioned or bright tin—"black iron," as it is called, or more and more commonly at the present time a mild steel, covered with a coating of pure tin. The dull tin, which is now largely made, has the coating of tin with an admixture of lead. The bright tin, which alone of these varieties is safe for culinary articles, and which is often also supposed to be best suited to use on buildings, is considered by many whose experience is of value, to be inferior for this purpose to a good dull or "leaded" tin. The latter material, when redipped in the process of coating, resists corrosion from moist and especially from salt air much better than the former. The so-called galvanized-iron is either black sheet-iron covered directly with a coating consisting chiefly of zinc, or it is sheet-tin so covered, the iron having in this case a double coating.

COPPER LEADERS.

Far superior to either tin or galvanized-iron is copper, which is practically unaffected by the ordinary agents producing corrosion of roof-covering and leaders. It has been very considerably employed in first-class work, but its cost is at present a serious bar to extensive use. Galvanized-iron leaders cost perhaps 20 per cent more than tin leaders of the same size. Two or three years ago, before the rise in copper, leaders of the latter material cost approximately half as much again as those of galvanized-iron, but I am informed that they now (September, 1888) cost about two and one-third times as much as the galvanized-iron.

Copper leaders are made of all shapes and sizes used for other materials. Hot-rolled copper was the variety formerly employed on buildings, but prejudice was aroused against it because of its softness and the ease with which it loses its shape. Cold-rolled copper, which is now utilized in good work, is harder and stiffer, and if selected of a grade weighing eighteen or twenty ounces per square foot is found to be a superior and satisfactory material. Copper expands and contracts under changes of temperature much more than iron, and allowance often has to be made for this when the metal is used in construction. In a long vertical rain-leader of copper, provision for change of length is often made by introducing one or more slip-joints, at which there is a lap of perhaps three inches, and at which solder is omitted. The slip-joint of course offers some opportunity for the escape of sewer-air, if that is allowed to enter the leader; but if well-made the joint is claimed to be soon rendered fairly tight by a slight coating which forms on the metal. The protection afforded to tin and galvanized-iron pipes by their distinctive coatings may be further increased by coating with tar and asphalt, or by use of the Adamanta or other coverings.

But while a suitable material is essential to the endurance of the pipe against corrosion, its protection against bursting by ice is to be obtained partly by the mode of joining the material, but chiefly by the shape given the pipe in cross-section. The common tin pipe is made in short lengths soldered together at the transverse joints, each length having a straight longitudinal seam, which is either a soldered lap-joint or a simple locked joint. The lap-joint is not so strong as the rest of the pipe, and under the great expansive pressure of ice is opened. Whatever, then, tends to strengthen the longitudinal jointing of the pipe gives greater resistance against moderate ice-pressure, although no plain pipe of ordinary thickness is proof against rupture by ice. The locked-joint is an improvement upon the plain soldered lap-joint, and is used for galvanized-iron and copper as well as for tin. The plain lap-joint can be strengthened by riveting, and I have seen copper leaders made with a straight soldered and riveted seam, which is claimed to be stronger than the main body of the pipe, the latter yielding first to ice. Galvanized-iron leaders are also made with a patented spiral and riveted seam, which renders them very strong.

SECTIONAL FORM OF LEADERS.

Economy of material for a given cross-section of pipe demands the use of a plain circular form; but it is evident that no shape would be more unyielding against the expansive power of ice, and in order to accommodate the latter and prevent rupture the expedient of a fluted or corrugated pipe was hit upon some fifteen or twenty years ago, and patented. This form of pipe has been very extensively used, and appears to have been generally satisfactory in resisting ice, readily changing its shape under pressure. The galvanized-iron and copper pipes are all to be had of the corrugated form, being usually circular in general shape, but often made rectangular as being more ornamental. A good corrugated copper pipe would appear, all things considered, to be the best available construction. The patent upon corrugated-iron pipes expired a year or two since and they are now manufactured by a number of competing firms. Even if a leader-pipe be used which will not be ruptured, it is, if exposed, liable to become so choked with ice as to be unable to carry off water, and the same thing also happens in the case of gutters. Hence in a climate so cold as that of Boston, resort is frequently had to the use of steam, not so much, however, for the purpose of preventing the formation of ice in freezing weather as to clear a passage for the water when a thaw comes on. Most large buildings, at the present time, have a supply of steam, either for heating or for power, which can without much difficulty be drawn upon during the daytime for use in the way that has been mentioned.

The most common method of using steam for thawing out leaders is to introduce a small jet from perhaps a three-eighths inch or a one-half inch pipe at the base, and allow the steam to rise up through the leader. This plan is followed at the Wakefield Building, on Canal street, in Boston, and as a precaution steam is thus at times introduced also into the base of an iron leader in the Wilde Estate Building. At the Sloane Building, in New York, the same plan has been successfully tried, but has been practically superseded by allowing hot water to drip into the tops of the leaders. Waste steam from the heating and elevator systems passes into small drum-shaped condensers on the roof, and the hot water of condensation is conducted through drip-pipes to the leaders. The climate of New York City is so much milder than that of Boston that comparatively little trouble from ice is experienced, and the common practice of an untrapped connection with drains and sewers, the air of which is warm, tends to prevent serious accumulation within the leaders.

Another method, which is sometimes but less commonly used, is to carry up a steam-pipe through the interior of the leader. At the Cheney Building, in Hartford, Conn., a three-quarter inch steam-pipe is thus employed. This pipe has an iron cap a foot or so above the roof, the cap being perforated by a small hole to permit some circulation of steam, but the hole quickly becomes stopped by rust. The condensation of steam within the pipe and the freezing of the water thus formed has split the pipe at various points; but the steam escapes all the more readily in consequence, and the arrangement is entirely successful in clearing out the leaders.

CLEARING GUTTERS OF ICE.

Even if the leaders are kept open the gutters are very likely to become clogged with ice, and then fail to perform their duty. Attempts have therefore been made to clear these also by the aid of steam, and on the Studio and Museum buildings, in this city, may be seen arrangements of steam-pipes for this purpose. The gutters are of the common half-round metallic type, projecting out from the edge of the roof, the steam-pipes extending along over the centre of the gutters and about on a level with the top. On the Studio Building the pipes are pierced beneath with small holes at intervals of, say, six inches, with the object of directing downward into the ice of the gutter a great many small jets of steam. This device is not satisfactory, however. A hole is melted in the ice by each jet, but ridges are left between the adjacent holes that have to be chopped away. Water also enters from the gutter into the steam-pipe, freezes there and bursts the pipe.

It seems probable that if steam-pipes are to be used in gutters, they should either be arranged with jets closer together than in the case just mentioned, and perhaps directly obliquely into the gutter, or they should be tight pipes laid on the bottom of the gutters, with a circulation of steam assured by an opening at the end or by a properly-arranged return-pipe, and with sufficient grade so that the water of condensation may readily flow off. On the Wakefield Building, and to some extent on the Studio Building, steam is brought onto the roof from the nearest convenient point in a hose, and in that way directed at will upon the ice in the gutters. In the latter building the steam employed is that used for heating, is at a pressure of six or eight pounds only, and is found not very efficient in cutting out the ice; but on the Wakefield Building the steam is that used for power, is delivered under a pressure of fifty or seventy-five pounds, and is considered very satisfactory in clearing the gutters.

In conclusion, it may be said that in the case of large buildings, at least, it is possible, by some of the methods that have been pointed out, to avoid all inconvenience from roof water from whatever source: and on private dwellings, if the water is brought down from the roof in a vertical and unbroken descent and a good corrugated pipe is used, there will be but little trouble. In most cities the destination of the water, whether it be directly discharged into the house drain or into the street gutter, must quickly be the public sewers. To what extent, if at all, this water shall be excluded from the sewers which convey the other house drainage, is a question of importance in certain cities, but its discussion need not be entered upon here.

Church of St. Edmund, the King, London.—The *Athenæum* notes that another of Wren's churches in London has been condemned. It is that of St. Edmund, the King, in Lombard Street, the interior of which is only sixty feet by forty, but its tower and picturesque spire are a familiar landmark. A memorial to spare the tower has been getting signatures. Here was buried when the present edifice was not, but one destroyed in the great fire, one of the first English writers on architecture. His monument bore an inscription calling John Shute

> "him that sought in science sight to publish prudently
> Among the rest of things, the which he put in ure,
> That ancient practice and profound, that bright of architecture."

Shute was a painter-stainer and architect, who in 1550 was sent to Italy, by John Dudley, Earl of Warwick, to study. He published "The First and Chiefe Groundes of Architecture."

ARCHÆOLOGICAL CAMPING IN ARIZONA.[1] — V.

A RECONNOISSANCE TRIP TO CASA GRANDE AND BEYOND.



Corner shop of XV Century at Thiers.

ONE of the pleasantest features of our life at Camp Hemenway was the reconnoissance work undertaken now and then, excursions off into the mountains and out on the plains in search of other remains of the ancient races. My first experience with an expedition of this sort was in the latter part of January. Three weeks before, I was in the midst of one of the severest winters I had ever known, and had passed in Chicago the most marrow-penetrating and uncomfortable January day I can remember. Now the only reminder of winter was to be seen in the gleaming white-robed peaks standing guard over our valleys to the northward and eastward, dazzling in the transparent atmosphere and undimmed sunshine. To be sure, when the sun went down the dry air became sharp and overcoats necessary, while the mesquite-wood fires roared in the little stoves and cheerily warmed the tents. In the morning, now and then, the *acequias* were skimmed with ice, but an hour or two of sunshine was enough to assure us June weather for the rest of the day. This expedition, however, was to take us out into the open air day and night, and in setting out I had some misgiving as to how we should stand the cold after sundown.

For several days preparations for our trip had been under way. To assure shelter in case of the rare contingency of stormy weather a "Gilbert-Thompson tent" was determined upon, and Sanchez, the versatile and volatile Mexican, had been patiently at work with canvas and needle in the midst of our plaza, putting it into shape, under the supervision of Don Carlos. Mr. Garlick had brought the idea from the United States Geological Survey, where, during his long service as surveyor, he had thoroughly tested the advantages of this tent. Mr. Gilbert Thompson, one of the chief officials of the Survey, will receive the gratitude of all camping-parties who make a trial of his simple and ingenious tent, and tent-makers would do well to adopt the pattern for a standard. Our tent was made with some modifications devised by Mr. Cushing and Mr. Garlick, between them. Its advantages were many, including the features of simplicity, compactness, capacity for expansion, and ease of putting up and taking down, having no guy-ropes, cross-pieces of wood, etc. It can best be described by imagining a tent pyramidal in shape, and with a diamond for a ground plan. Cut this structure in two and set the halves ten feet apart or so and connect them with flaps, making an A-tent closed in at each end with a V. All that is required for a support is a pole of seven or eight feet at each end, thrust up through a hole into which it fits at the apex, and firmly guyed by tent-pegs holding the canvas to the ground at the corners of the triangles. Three or four additional pegs were sufficient to hold the flaps to the ground. The whole tent could be pitched ready for use in three or four minutes, and taken down and folded up in half the time. The front flap was made to be laced to the sides, but in pleasant weather it was raised up and supported on sticks, each guyed with a single cord. This gave increased room and shelter, with agreeable shade from the hot sun by day and giving a pleasant, veranda-like effect. Of all tents, this pattern is the most picturesque. In a second and larger tent, afterwards made to be used in case that two reconnoissance parties should be in the field at the same time, a great improvement was effected by making both sides of the A-section movable, like the front flap in the original pattern. With this device either side could be raised at will, changing the face of the tent according to the direction of the wind, so that it would not be necessary to turn the whole thing around to obtain shelter. On hot days the raising of both sides gave a free passage of air. With four triangular pieces of canvas fitting onto the sides of these raised flaps, and curtains at each end, all reefed or laced together, the capacity of the tent was enormously increased, making a sort of canvas hall. In this shape it was used as a dining-tent at Camp Hemenway, when not in use in the field; and in three or four pouring rains that we had it was well and successfully tested as to its storm-proof qualities. The first tent was taken by Dr. ten Kate on a long trip of several weeks, made for anthropological observations among the Pima and Papago Indians, and was of invaluable service.

Our trip began on the morning of Monday, January 23. The men had been preparing all the morning, under the direction of Don Carlos, piling onto the wagon the fodder for the animals, provisions for ourselves, kettles and tins, picks and shovels, the whole followed by our mattresses and blankets, with our needed extra clothing and toilette articles rolled up within and securely held by stout straps. On either side of the wagon were secured two large casks for water, a most essential feature for any journey in this arid country, where "dry camps" often have to be made. At last everything was ready, and we started with a great clattering of hoofs, rattling of wheels, shouting and gayety, for the prospects of a week of roving appealed to the primitive man latent within us all, and ready to assert himself when aroused; so the opportunity for getting closer to Mother Nature and making ourselves savages, so far as we might choose to be, produced a marked elation of spirits in everybody, from the Director down to the laborers.

On the high seat of the great lumbering "Studebaker," drawn by four big mules, were perched Mr. Cushing and Don Carlos, the latter driving, and swinging a formidable long-lashed whip, which, in the course of the journey, was destined often to induce into more vigorous exertions the two off animals, for it is the custom always to hitch the two laziest ones on the right side within easy reach of the driver's persuading facilities. Behold, reclining on the load, with our bedding and the tent making easy seats, were four of the Mexican laborers, including Sanchez, who was taken along as cook and interpreter for intercourse with the Pimas. His cooking was something fearful and wonderful; but his interpreting was excellent, for among his many accomplishments was that of linguist; he was a master of the "polite languages" of the Southwest: Pima, Papago, and various aboriginal idioms of Sonora, in which Mexican State he was born of a Papago mother and a Mexican father, the various race strains derived from the paternal side evident in him, according to appearances, in Iberian, Moorish and Negro, together with enough Indian to make a considerable addition to his maternal heritage from that source. His vivacity and vagabond good nature made him a universal favorite, so that we even consented to overlook his grave culinary deficiencies for this occasion only; on our next trip Mr. Cushing took care to make another appointment to that important office.

In tow of the wagon trotted the sleek and sturdy Douglas, and Dr. ten Kate and I followed up the rear in an easy buckboard drawn by Bob and Mary, for whom Douglas, in accordance with the remarkable affinity of mules for horses, was a magnet that, so long as he was in advance, spared us the necessity for any use of the whip, and indeed often cost much muscular exertion to keep them far enough back out of the dust.

Turning southward, we proceeded along the even-surfaced plain that now sloped imperceptibly towards the Gila, and were soon within the limits of the Pima reservation that stretches for miles along that river. To the left were the Zacaton mountains, and to the right the steep wall of the Estrellas rose abruptly just beyond the river. The road was now sandy, now hard and smooth as macadam, and around was the characteristic vegetation of the Southwestern desert: stretches of sage-brush in gray monotony; areas of the shrub-like hediondillo, or greasewood, with its evergreen leafage of dark and unrefreshing hue; occasional expanses of mesquite timber, scraggy-limbed and low-growing; and here and there spaces of bare ground, sometimes brown, and again snowy with alkali exudations, while varieties of cactus gave final character to the landscape, with its fleecy-looking chollas that in the distance had an effect of browsing sheep, and the grotesque nopals with their disc-like leaves, to the great saguaros, or giant cactus, that gave the desert a sort of populous air, seeming like some strange being, standing in mute silence, with their tall column-like trunks towering forty or fifty feet close at hand, or rising in dark lines out of the bush in the distance, their side-branches turning sharp right-angles upwards, like uplifted and warning arms.

While the elements of beauty, as we commonly regard it, are deficient in this landscape, still it has much of interest, and even charm of its own; and following the eyes of a poetic and sympathetic beholder like the late Mrs. Helen Jackson, whose descriptions of unattractive features like sage-brush and sand-wastes linger delightfully in the memory, much is revealed that might have remained hidden. The glorious sunshine, pouring down full and warm, gives a calm, large joyousness to what under a different sky would be a stern and gloomy country. But here Nature, though impassive, and unresponsive and overwhelmingly vast, suggests an unrestrained freedom to her children in a spaciousness where they can be themselves if they will, with the gladness that is born of ample room for the feet to rove and the thoughts to roam. My companion said that this broad landscape, with its tawny distances showing seemingly forever the same in the transparent atmosphere, had a great fascination for him, appealing to him more strongly than the most beautiful cultivated scenery, with its suggestions of the restraints and conventionalities of civilization.

Towards noon we came to the remains of great irrigation canals, and the ruins of an ancient city, with the mound that signified the crumbled walls of a great central temple, or "House of the Priests," of the Casa Grande type, and an enormous "Sun Temple," or basin-like oval of crumbling earth, which some investigators had pronounced

[1] Continued from No. 683, page 44.

to be the remains of reservoirs, as they found them recurring here and there, forgetting the fact that they were raised above the surface of the surrounding ground and therefore could not possibly have been used to hold water, since there was no means of filling them. By close observation and analogy Mr. Cushing perceived these to have been the places of religious assemblage and ceremonial, — now usually called by the Spanish name of *estufa*, from the fact of their being underground in the northern Pueblos — presided over by the Priest of the Sun, a functionary who is distinct from the hierarchy of the Priests of the House, and the spiritual head of the community. These buildings were evidently in the shape of an inverted boat, with wattled frame and mud-plastered. The Pimas still construct their huts in this form, which was probably the original type of primitive dwelling in this region. According to the lines of sociological evolution, the customs of ancestors gradually become the attributes of the gods, as they disappear from common usage, and thus the primitive dwellings became the houses of the gods, and the chief religious edifices are thus fashioned. After gathering numerous examples of the fragments of decorated pottery that littered the ground in great profusion, we proceeded southward, and soon came to the cultivated fields of a Pima village bordering the Gila, whose course was indicated from afar off by the long lines of cottonwoods growing on its banks. Their branches were leafless, and the silvery gray of their bark gave them the appearance of a silent ghostly procession. The Gila here is not so wide as nor of such volume as its tributary, the Salado, which joins it some twenty miles or so below where we crossed. The mid-day sun was hot, the stream had a sandy bed, and the thought of enjoying a river-bath in January appealed to me with fascinating force, and while waiting on the thither bank for the more slowly-moving wagon to come lumbering up and across, I stripped and plunged in. It could be hardly called a plunge, however, for the stream was very shallow, and though I waded from bank to bank in search of some pool, the greatest depth was scarcely more than a foot, and only by dint of rolling over in the water could I manage to get wet all over! But it was pleasantly warm, and the effect was delightfully refreshing.

We wished first to visit the locality known as Casa Blanca (the White House), where there were said to be some interesting ruins. The overflow of some of the Pima *acequias*, as a consequence of the first irrigation of their wheat fields, had made our regular road impassible. Sanchez, as interpreter, obtained the information of the direction from a Pima hamlet which we passed, while the squalid-looking Indians gathered around in mute curiosity over our appearance. The Pimas are a harmless, peaceable sort of Indians, rather degraded-looking as a whole, and most of the women had the heavy jaws, coarse and brutal mouth and long upper lip that characterizes the lowest Irish type, and suggests a survival of the features of a lower race that once peopled all Europe, and was probably more extensively absorbed in the Celtic than any other of the Aryan peoples, since the Celts formed the advance wave of the new ethnic invasion. The nude children standing shyly around had much of the bright-eyed attractiveness common to childhood in all races. The Pimas are an exceptionally dark-skinned Indian people, having a duskiness equal to that of many negro tribes. This is probably owing to the slight altitude. I have noticed that in the warm latitudes the altitude of the country seems to have a considerable influence in determining the color of the skin. The Indians on the Mexican table-land are much lighter than those on the coast, and I have observed that the Mexicans in New Mexico are very much lighter in complexion than those of these regions in Arizona and Sonora, where the altitude is inconsiderable.

Desiring to cover as much ground as possible in our day's journey, we had made no halt for lunch, intending to get an early supper. Towards mid-afternoon the gnawings of hunger began to be acute, but my companion, the doctor, had fortunately a package of chocolate with him, and it satisfied our appetites for a while. At Casa Blanca there is a Pima village, and a trading-post belonging to the firm in Florence, Tex., that has the monopoly, by contract, of trading with the Pimas on their reservation. The business is said to be very profitable, consisting mainly in bartering cotton cloth, gaudy calico prints, tobacco, sugar, gewgaws, etc., at a high valuation for wheat, skins, etc., at a low valuation. Like most of the large commercial houses in the Southwest, the firm is a German one, and has mainly German employés. There were great piles of wheat in bins, and my hunger had by this time returned to such an extent that a handful of the plump grains was eaten with excellent relish!

Near the post rose a great mound similar to that at Los Muertos, surrounded by the ruins of a considerable ancient city. This was Casa Blanca. From the name having been applied to the mound, it seems as if the walls must have been partially standing at the time the Spaniards first came here. Its walls were evidently white or whitish in color, and its name was probably given in contradistinction from the neighboring Casa Grande, which was also known as "the Red House." Two or three shallow holes in the mound indicated that some excavation had been attempted. Pinart, the French archæologist, had been here a few years before, and these were probably his traces. They amounted to nothing more than mere peckings at the structure, and could have revealed nothing conclusive. Mr. Cushing had thought of making some examination here, but there was such a swarm of Pimas about that nothing could have been done without great inconvenience, and so we kept on, after replenishing our water-supply, intending to camp at the first inviting spot a mile or so to the eastward. We soon came in sight of another great ruin-mound, and so it was decided to camp in a pleasant thicket a little ways from the road, where wood for our fire would be forthcoming. Our Gilbert-Thompson tent was pitched in a minute, our beds were unrolled, and we lay comfortably stretched out, watching the preparation for supper and restraining as best as we could the impatience of hunger, to which the minutes before meal-time seem interminable hours. Fortunately an abundance of canned food in our mess-chest made elaborate preparation of our meal unnecessary, and as soon as coffee was made the supper had been spread out on top of the chest, which was so contrived as to be converted into an excellent table, and we fell to with gusto.

For me that cosy camp at Las Cenizas, as we named the place from the abundance of cinders found in the ruins the next morning, had the indescribable charm of novelty; and, indeed, the pleasant nights with which we were favored during our week's trip had the delightsomeness of a semi-vagabond life that for me was not in the least staled by repetition. The air was very mild, and perfectly calm, with the dry purity of the desert. As the night deepened, the bright blaze of our fire made the tent glow with an intense brightness against the back-ground of the thicket, and the sage-brush danced with mysterious, elusive shadows, populating the ring of the firelight which converted the gray bushes into a gilded feathery growth spreading about us. Sylvester Baxter.

[To be continued.]

SOCIETIES

ASSOCIATION OF OHIO ARCHITECTS.

The fourth annual Convention of the Association of Ohio Architects was held at Dayton, Ohio, on the 15th inst. The meeting was well attended, and was a very interesting one both professionally and socially. The Convention passed a resolution inviting the new American Institute to hold their first Convention at Cincinnati, and appointed a committee of seven to make proper arrangements for the entertainment of the Convention, should they decide to meet as invited.

Mr. Wm. Martin Aiken, of Cincinnati, gave a very interesting account of his recent trip to Europe. Mr. J. W. Yost, of Columbus, read a paper upon the subject of "How we should build," and also read the new law passed by the Ohio Legislature governing the erection, as to their safety, of public buildings hereafter erected in the State of Ohio.

Toledo was selected as the place of holding the next Convention, and officers were elected for the ensuing year as follows: E. O. Fallis, of Toledo, *President;* J. W. Yost, of Columbus, *Treasurer*, and N. B. Bacon, of Toledo, *Secretary.*

The afternoon was spent in a Tally-ho ride through the city and out to the Soldiers' Home. A banquet was given by the resident architects to the visiting architects, in the evening; and, take it as a whole, the Convention can be numbered among those which have been decided successes.

WESTERN ASSOCIATION OF ARCHITECTS.

There will be a meeting of the Board of Directors of the Western Association of Architects, on Tuesday, September 17, at the office of the Secretary, Chicago, Ill., for the consideration of applications of membership and the transaction of other business.

N. S. Patton, *Secretary.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE LONGITUDINAL SHRINKAGE OF WOOD.

Toledo, Ohio, August 20, 1889.

To the Editors of the American Architect: —

Dear Sirs, — In your last issue I notice a communication upon the shrinkage of timber endwise. I wish to say upon the subject, that in my experience I have frequently noticed that woods will shrink endwise, but I believe the cause to be on account of cross-grained stuff. I have noticed in the shrinkage of wooden joists, that a crack will occur in the plastering, in the angle formed by the walls and ceilings, of various lengths and widths, the cause being the unequal shrinkage of the joists caused by some being cross and others straight-grained, the cross-grained ones shrinking less than the others; and the floors on top being nailed to all of them, keep them level on the top surface and raise those that shrink off of their bearings, which also causes ceilings that may be level when new to become very much out of level after shrinkage has taken place, and to crack.

The same principle may be observed in flooring dressed before being thoroughly kiln-dried (as most of our yellow-pine floors are); the same board will vary in width in accordance with the direction of the grain. Picture mouldings secured to plastered walls afford an excellent opportunity for the observation of the shrinkage mentioned.

Yours truly, E. O. FALLIS.

THE INCLINATION OF PARALLEL VERTICAL WALLS.

NEW YORK, August 9, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Having read in the *American Architect* of August 3, an extract taken from the Pittsburgh *Despatch*, relative to high walls being out of parallel, I beg to inform you that in the October (1885) number, page 81, of the *Builder and Woodworker*, I published this fact in the following paragraph: —

"All plumb lines drawn to the earth's surface continue to its centre, showing that walls and other supposed parallel erections are not in reality parallel, and if continued to a sufficient height, a difference would be perceptible in the distance between them."

While working on an elevator in Connecticut, in 1883, I first noticed this practically, as the wall-plates of the upper-framing (placed at a height of 137 feet), which were laid out and framed on the ground, when set on the posts and studs, were found to be short. At first it was thought that the walls were not carried up plumb, but as they were proved perfectly so, there was really no reason why the plates should be short. I reasoned the above from Newton's theory, but could scarcely attribute the difference to this, because the walls were only 50 feet apart at the base, and I did not consider that the small curvature of this minute fraction of 25,000 miles would materially affect the width. Perhaps some mathematician would be tempted to work out the exact amount of variance in lengths of feet in proportion. Respectfully yours,

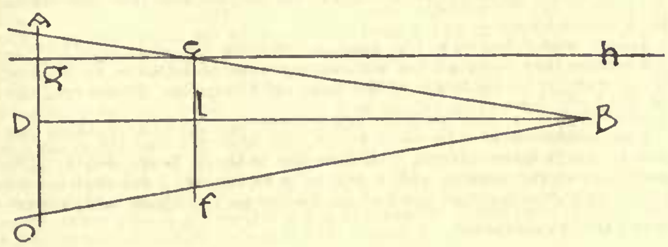
OWEN B. MAGINNIS.

NEW YORK, August 10, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In your issue of August 3d there is a clipping, "Curious if True," which, "*if true*" is "*curious*," since it violates all geometric reasoning.

In the first place let us compare by similar triangles the divergence to find the radius of the sphere.



Bisecting A B C by the radial line D B, and considering c f the circumference or crust of the earth, for such a small unit practically a straight line, 100 ft. long, A C the roof of building 100 ft. 3 in. A e 110 ft. Draw g h parallel to D B then will A g c and c l B be similar triangles in which A g = 1.5 in. c l = 50 ft., ∴

1.5 : 600 :: 110 : 44,000

that is, if a building 110 ft. high and 100 ft. wide is 3 in. wider at the roof, the earth is 44,000 ft. or 8⅓ m. radius or about 52⅓ m. in circumference.

Again suppose there were a continuous belt of houses 100 ft. wide, around the earth, whose roofs were 100 ft. 3 in. wide. How high would it be required to build the houses? The earth being in round numbers 25,000 m. circumference.

$$25000 \times 5280 \div 100 = 13200000$$
$$(13200000 \times 3 \div 12) \div 5280 = 625 \text{ m.}$$
$$25000 + 625 = 25625 \text{ m.}$$

As the radii of circles are to each other as their circumferences,

25000 : 25625 :: 4000 : 4100

That is a building 100 ft. wide would have to be 100 *miles*, not 110 ft. high, to be 3 in. greater on the roof line.

We can also call logarithms to our aid, but, from the acuteness of the angle, it will not be absolute.

Taking the result of our first computation as a basis 44000 ft. radius, we can state our general problem.

Given an isosceles triangle whose sides are 44000 ft. and base 100 ft. Required the angle at the vertex, here a = 44000 b = 44-000 c = 100 C? ∴

(a. c.) log. (s + s′) 44000 = 5.35654732351381256882
log. (b + c) 44100 = 4.64443858946783853601
log. (b — c) 43900 = 4.64246452024212137063
log. (s — s′) = 14.64345043322377247546 ∴
s — s′ = 43999.772985
= ½ (s + s′) + ½ (s — s′) = 22000 + 21999886492 = 43999.-886492

log. s + (a. c.) log. b = log. Cos. C.
log. s (43999. 886492) = 4.64345155484979791668
(a. c.) log. b (44000) = 5.35654732351381256282
log. Cos. C. = 9.99999887836361047950 ∴
C = 7′ 50″

Now given an isosceles triangle 44100 ft. on a side, with an angle at the vertex of 7′ 50″, required the base.

180° — 7′ 50″ = 179° 52′ 10″   179° 52′ 10″ ÷ 2 = 89° 56′ 5″
(a. c.) log. sin. B (89° 52′ 10″) = .0000003
log. sin. C (7′ 50″) = 7.3576723
log. b (44,000) = 4.644536951
log. c = 12.002209551 ∴

c = 100.5. That is the roof line would be 100 ft. 6 in., the inaccuracy comes in reading "log. Cos. C = 9.999998878 + as 7′ 50″ which is slightly in excess. 7′ 47″ probably being nearer, though the tables read no closer than 10″.

Hoping this proves the "architect" to have been right, that is in such relatively small distances on the earth's surface, plumb lines are practically parallel. I remain, yours respectfully,

EDWIN R. STORM, *Architect.*

A BATH LINING.

KANSAS CITY, MO., August, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Can you inform or enlighten me on the following subject? I wish to find some substance which, applied to the inside of a large cement-lined plunge-bath would render the surface white or nearly so, and give a smooth surface impervious to water. I wish to avoid the use, if possible, of vitrified tile lining on account of expense. Could you also inform me where I could obtain the last mentioned material for lining? Any information you could give me on the subjects would be greatly appreciated.

Truly yours, T. E. GOOCH.

[THE only material we know of that seems to give promise of being satisfactory is the "Bath Enamel," which is imported by E. Aspinall, 98 Beekman St., New York. Plain glazed tiles can be obtained from any of the dealers in tiles who advertise in our columns. — EDS. AMERICAN ARCHITECT.]

AN ALLEGED PURLOINING OF DESIGN.

NEWARK, N. J., August 24, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sir, — I made drawings for a dwelling-house in Newark, and the house was built after same. Now a second party wants to duplicate the house and employs another architect, and he goes to the builder of my house and gets all the drawings, etc., and follows them as I understand, line for line. Now is there any way that I can get compensation for the use of my drawings, and if so, whom shall I look to for same, or are my drawings public property? By answering same you will greatly oblige.

Yours respectfully, W. F. ZIMMERMAN.

[YOU could probably get whatever damages a jury might see fit to award you from the owner of the house copied from yours, if the jury thought that it was with his collusion, or by his direction, that his architect used your drawings. You would naturally claim as your damages whatever you would have made if he had employed you as architect, instead of the other ornament to the profession; and we are inclined to think that most juries would consider this a just claim. — EDS. AMERICAN ARCHITECT.]

A PARTY-WALL QUESTION.

YORK, PA., August 21, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you kindly submit the following party-wall problem to your Building Law department? A owns a corner-lot and building thereon. My client B (an estate), owns adjoining lot from which all of buildings (except portion of front cellar wall as below noted) has just been removed to make way for new building. Corner, or A's house, was built many years ago. When B's house was erected some years later, A's brick wall became a party-wall with such additions (presumably by B) to length and height of said party-wall as were necessary to increase required size of B's building. Some years later A increased the size of his building by building on top of party-wall to make the required additional story height. Some years later B increased the depth of his building, constructing the necessary party-wall at (presumably again) his own expense. No additions have been made by B to the party-wall for the past twenty-five years. Previous to this time no dispute about the party-wall can be recalled by B's family. No recorded or written agreement has been found. A thinks B ought to pay him for use of the wall for the new building. B's plans require no addition to party-wall. A further says that his deed calls for 28′ 9″ front, whereas the actual measurement is 28′ 3″, therefore B must have 6″ of his ground. B's deed calls for a "half lot," feet and inches not mentioned. A half lot in this street means 28′ 9″. The actual measurement of B's front in width is 26′ 11″, or 1′ 10″ short. About 5′ in length of old cellar-wall, on front and abutting against party-wall, has been left standing; on this it is proposed to lay granite sill and start brickwork that is to be built against old party-wall.

A-portion of party-wall must be underpinned to accommodate extra depth of B's cellar. EQUITY.

[EVERYTHING in this case would depend on the party-wall agreement, which might have been verbal and still be valid, if it can be established by evidence. If there is absolutely no means of finding out what the agreement was, we should say that the presumption was that each party, in making additions to the wall, did so, as is usual, at his own expense, but with the understanding that his neighbor, if he subsequently used any part of the new additions, should then pay half the value of the portion which he used. In the present instance, B seems to be intending not to add to the party-wall, but to use a part of that already existing that he had not used before, and he is presumably bound to pay A half the value of the additional part which he is now going to use. The underpinning of party-wall, to increase depth of B's cellar, would in the same way be at B's expense, and if A should subsequently deepen his own cellar, he would be bound to pay B half the cost of the underpinning of which he then enjoyed the advantage. Whether A or B has more land then he is entitled to, is a question for surveyors to settle. — EDS. AMERICAN ARCHITECT.]

NOTES & CLIPPINGS

REVERSALS OF BUILDING PRACTICE AT PARIS. — "The engineering exploits at the Paris Exhibition," says the *New York Sun*, "violate in many cases what might be called axioms. An arch has always been rigid at its crest, a tower broad, thick and solid at its base; and just in proportion to the span of the arch or the height of the tower have the keystone and base been ponderous. In the Hall of Machines, with a truss-arch span of five hundred feet, the crest of the arch is in no way united, but the two elements of the arch simply lean against each other, a transverse steel roller receiving the enormous pressure of contact. The base of the arch, instead of widening out and being heavily grounded in masonry, to stand lateral stress, comes down to a point, and rests directly on a cast-iron plate with a circular bearing. These audacious contrivances are to permit expansion and contraction, and the whole vast roof, over a sixth of a mile long, rises and falls with every change of temperature."

THE LONDON FOG IS HEALTHY. — If London is the metropolis of the land of fogs, there is much consolation to be found in the fact that in spite of its smoke and its fogs it is not only one of the healthiest cities in the world, but is growing healthier every year. According to the official statistics for the quarter ending June last, our annual deaths are only at the rate of sixteen per thousand. If we could eliminate from the calculation some overcrowded and notoriously unhealthy districts, the figure would, of course, drop considerably. Still more remarkable would our sanitary condition appear if the area were confined to the high and airy suburbs in which so large a proportion of those who are by day "in populous city pent" are fortunate enough to dwell. We have only to contrast this condition of things with the statistics of other capitals, to see how great is the advantage we enjoy. In Paris, which shows a comparatively good record, the mean annual death-rate is 32.10; in Berlin it is 27.5; in Vienna, 26.7; in Munich, 32.9, and in St. Petersburg, 43.7. In Brussels, which appears to be the healthiest of Continental cities, it is 18.9. To sum up the case, the death-rate during the quarter in twenty-nine colonial and foreign cities, having an aggregate population exceeding 16,000,000 persons, was 26.6 per 1,000, or more than 10½ persons per 1,000 in excess of the London death-rate. — *London Daily News*.

A LARGE VAULT. — In the burglar-proof department of the Diebold Safe Works there stands a house of steel that in a short time will contain a good share of the wealth of the prosperous State of Kansas. It is a steel burglar and fire proof vault, about completed, for the new State Treasury building being built at Topeka, Kan. The vault is large enough for a dwelling for a small family, being 30 feet long, 17 feet high and 15 feet wide. The structure is set up and being carefully examined at the works, preparatory to its shipment, which will be in about a week, and for which about fifteen cars will be required. The walls are of the best chrome steel, 2 inches thick, in four one-half-inch layers. The entrance is a triplicate door, with a total thickness of 8 inches, fitted with a consolidated time-lock and special bolt device. Twenty-four bolts, 1 3-4 inches in diameter, are in the door, which weighs 5000 pounds, and is opened and closed with a special screw apparatus. The vault complete weighs about 200,000 pounds. Hundreds of bolts are used, but none penetrate from the outer to the inner layer of steel, each bolt only passing through two of the four layers of the wall. The inside of the door is covered by French plate glass, showing the workings of the locks and bolts, and the exterior is handsomely ornamented with nickel and gold. The vault contains two floors, the first for money and the second for valuable documents, etc. A staircase leads from the first to the second floor, and the vault will be lighted by electricity. Two large Diebold burglar-proof safes will be placed inside the vault. The vault and two safes will cost, after being put up and ready for use, in the neighborhood of $25,000. In the burglar-proof department of the Safe Works half a dozen safety-deposit vaults of smaller dimensions, but larger than the ordinary, are being built for banks in different cities. — *Canton (O.), Repository*.

MORE ABOUT THE ADVENTURER'S MOIETY STOCK. — A sale by auction was made in London on July 17, which in its way is as noteworthy as the sale of Millet's picture. The property disposed of was "one entire and undivided share in the Adventurer's Moiety of the estates and interests of the New River." The "Adventurer" was Hugh Myddelton, the projector of the New River, and this is the first share of that property which has been sold since the work was completed in the year 1613. The value of a share at that date was £100. There were seventy-two shares in all; half were taken by the King and half went to Sir Hugh, who was knighted by James I., in recognition of his work. The King's shares were afterwards sold by Charles I. to the second Sir Hugh Myddelton, for a yearly payment to the crown of £500 in perpetuity. The net return on these thirty-six shares was last year £93,960, though the nominal capital of the company, as shown by Parliamentary returns, is only about three and a half millions. The company possesses the exclusive right of supplying water to all the northern suburbs of London, to the whole of the city of London and part of Westminster, to several wealthy parishes in the West End, and to parts of Middlesex and Hertfordshire. Valuable estates also belong to it, the chief of which, the Myddelton Square property, consists of fifty acres in the very heart of London. The New River aqueduct was an object of public interest and curiosity long after it was completed. Evelyn notes in his diary a visit to it in the year 1686. The share that was sold the other day brought £122,800. — *N. Y. Evening Post*.

TRADE SURVEYS

So many new facts and conditions have to be taken into account in the formulation of intelligent conclusions concerning business and trade that it is difficult at times, and especially at this time, to reach results that will stand the test of after-happenings. There has been a general overhauling of accounts, a general examination of securities, a wiping-out of accrued indebtedness, a scaling down of expenses and cost. Banks have been setting a good example. Railroad companies have been reorganizing and rearranging their affairs, buying stock and power when needed, ordering necessary new work to be done, and in every way preparing for even sharper competition which seems inevitable. Manufacturing interests are realizing narrow margins, but there is a good volume of business. The volume of money is sufficient for commercial needs; reserves are low; even the Bank of England is down to $57,500,000. Prices generally are firm. Production is kept down to actual or supposed needs. Accumulations, where they appear, are simply supplies awaiting call. The textile manufacturing interests feel better. Hosiery manufacturers, since the reformation in appraisements, have more to do. The woolen interests meet in New York, September 17, to confer for their better protection. Cotton-goods production is a little ahead of the market. Iron prices are advancing abroad, and are very strong at home. Ship-building wants are crowding supplying sources. House and mill building activity has not diminished, although fewer permits are being taken out as the close of the active outdoor season is near at hand. House investments have paid well this season, but building authorities regret to see in many quarters a partial return to the practice of building extremely cheap houses. Much activity prevails in mill and shop extension, both as to space and power. Machinery builders have much work promised for the fall and spring, but, on all ordinary work which can be had in the average shop, prices are cut low. The locomotive builders have secured more work this year than last, but not until the third quarter of the year has the increase become apparent. Crop reports afford much hope for strong prices and a good movement in all trade channels. The business world has not yet forgotten former trade depressions, and remembers they came almost without announcement and remained until they burned out. Economic or financial knowledge has not yet been able to ward off these evils, except in a measure. Since the last depression several steps have been taken out of conditions that rather encouraged commercial misfortunes. The volume of money has been doubled, exchanges can be made more rapidly, transportation is lower, production is under more intelligent control, and a generally symmetrical development has taken place, which avoids much of the friction that was incessantly disturbing tranquil conditions. Trusts and combinations are quietly multiplying, which is but another way of stating that larger organizations are supplanting smaller.

The step from the individual business-man to the firm, and from the firm to the limited company, and from that to the larger corporation, is now being followed by a larger step in the same direction. Competition is as mighty a factor in the commercial world as gravitation is in the physical, and affinity in the chemical, and no temporary suspension of that great power of competition need cause alarm. While these new giants are putting on their new clothes and trying their newly-acquired strength, they may seem to be able to override and disregard the general interests, but the logic of the situation forbids the doing of much harm. The labor market is quiet, and there is very little superabundance of labor in the mechanical branches. In some industries wages have been advanced; in some, as for instance in mining, in a few fields, wages have been reduced. Striking agitation has ceased to be the policy of all the larger organizations. The programme formulated some eighteen months ago, of striking for eight hours next spring, has not been withdrawn or altered; but many things have since happened, which in the opinion of the wiser heads call for further consideration before striking the final blow. Many branches of organized labor have no more than a sentimental interest in the question, but labor is easily aroused to rash action, and it is therefore best to be ready for the worst. The attempt to draw all branches together is more formidable in appearance than in reality. The question is, will the paper-union of a few heads bring the masses of the respective organizations into hearty accord for coöperated effort? The probabilities are altogether the other way. The speculators, the investors, and the manufacturers, who are enlarging, or are anxious to enlarge their plants and power, are all studying the present situation with intense interest. Not for years has there been such a speculative desire, but the danger holds it in check. Investors are anxious for a final settlement of railroad questions, but the railroad affairs, especially in the northwest, are in a worse muddle than ever. The manufacturing interests are enlarging and expanding, because there is nothing else to do, and no sound reason for not enlarging. Little traders and manufacturers are springing up faster than ever in the new states recently supplied with more abundant railway facilities. Margins on most investments are declining, but with this decline there is a greater wish of investing capital. Mining operations, under better managements and more scientific methods and cheaper transportation, are paying better, and therefore are attracting more capital, the bulk of which comes from home sources. Foreign investors shun railroad and mining stock, cattle ranches, and the like, having been unfortunate for years past in much of this business. Americans, with better opportunities and assisted by the establishment of banks all over the newer sections are making more profitable ventures.

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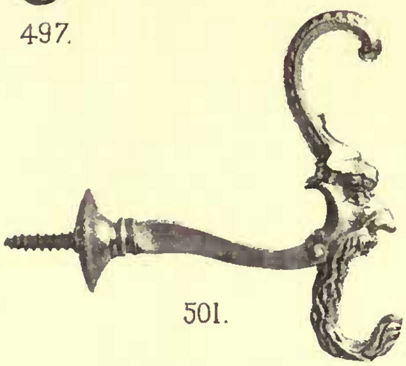
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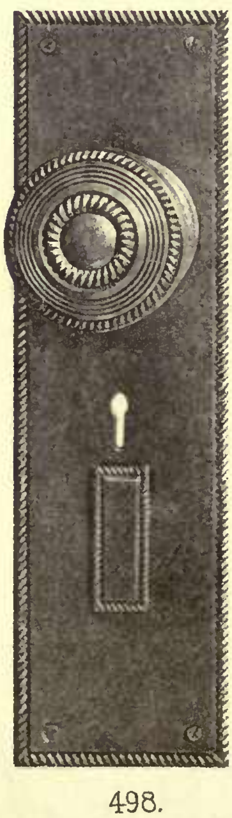
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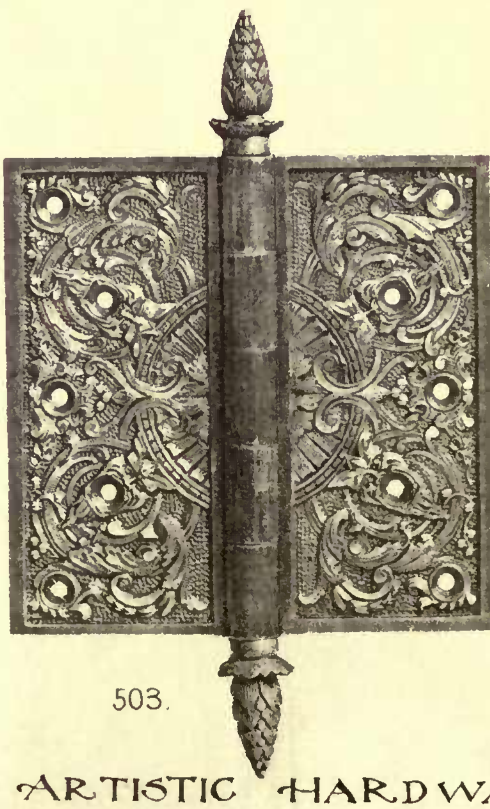
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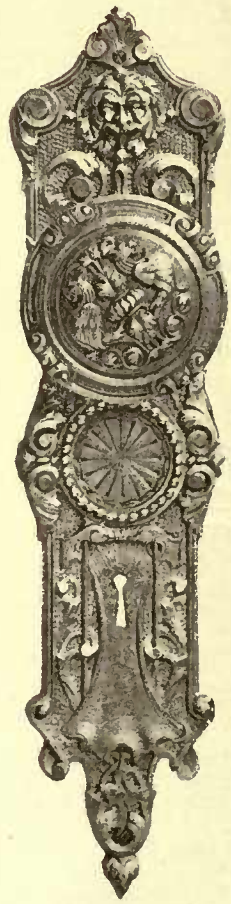
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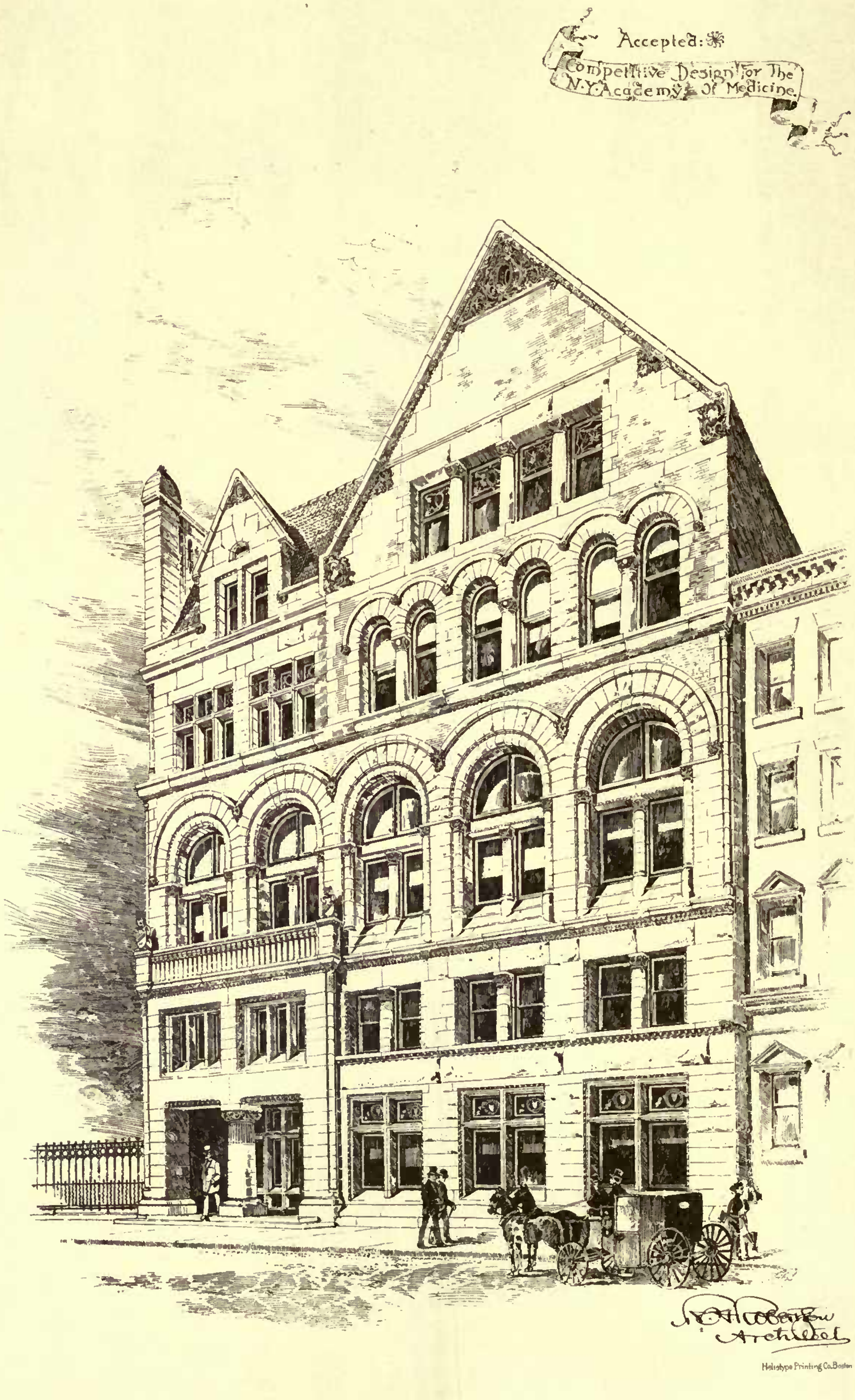
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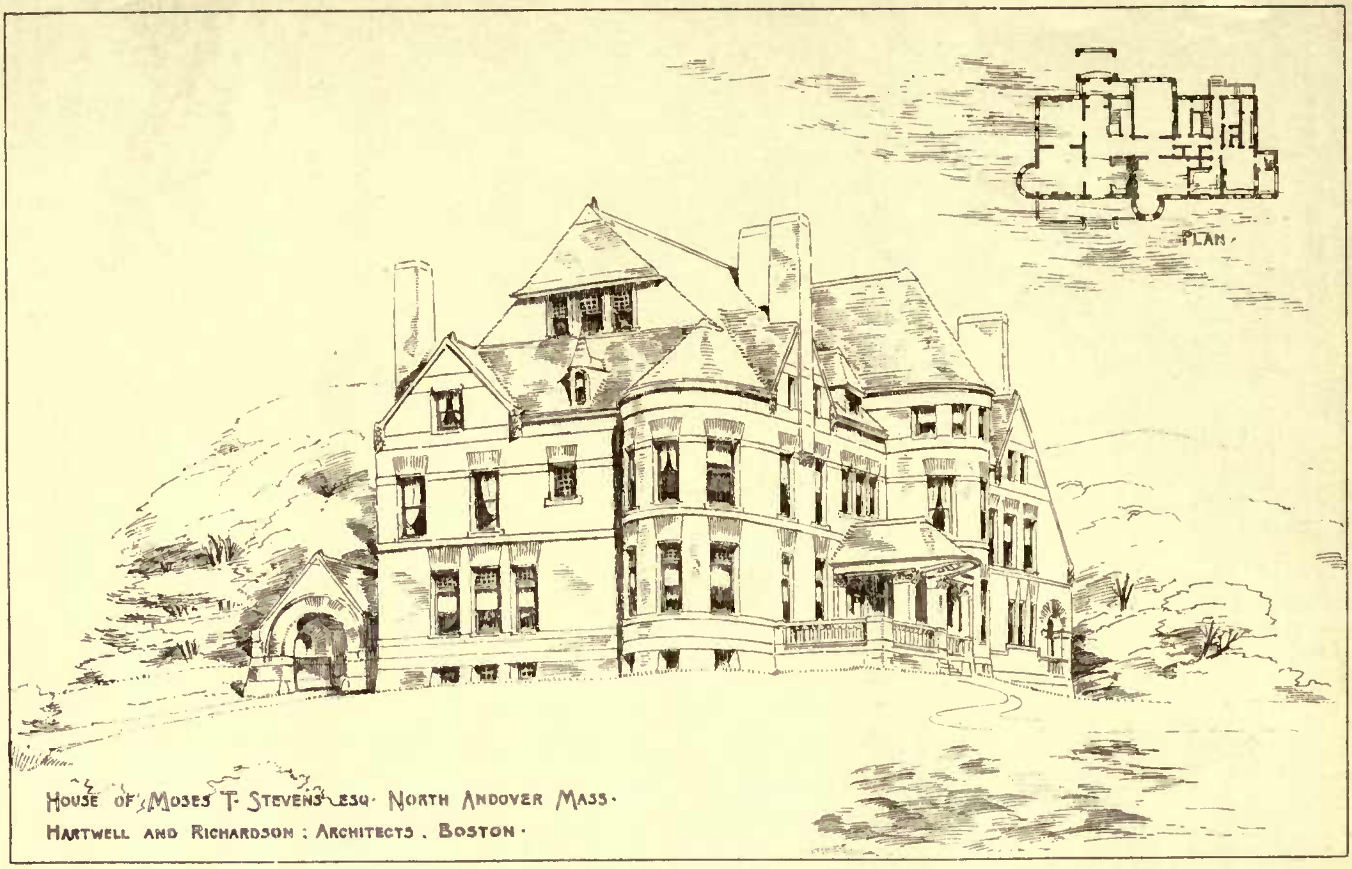
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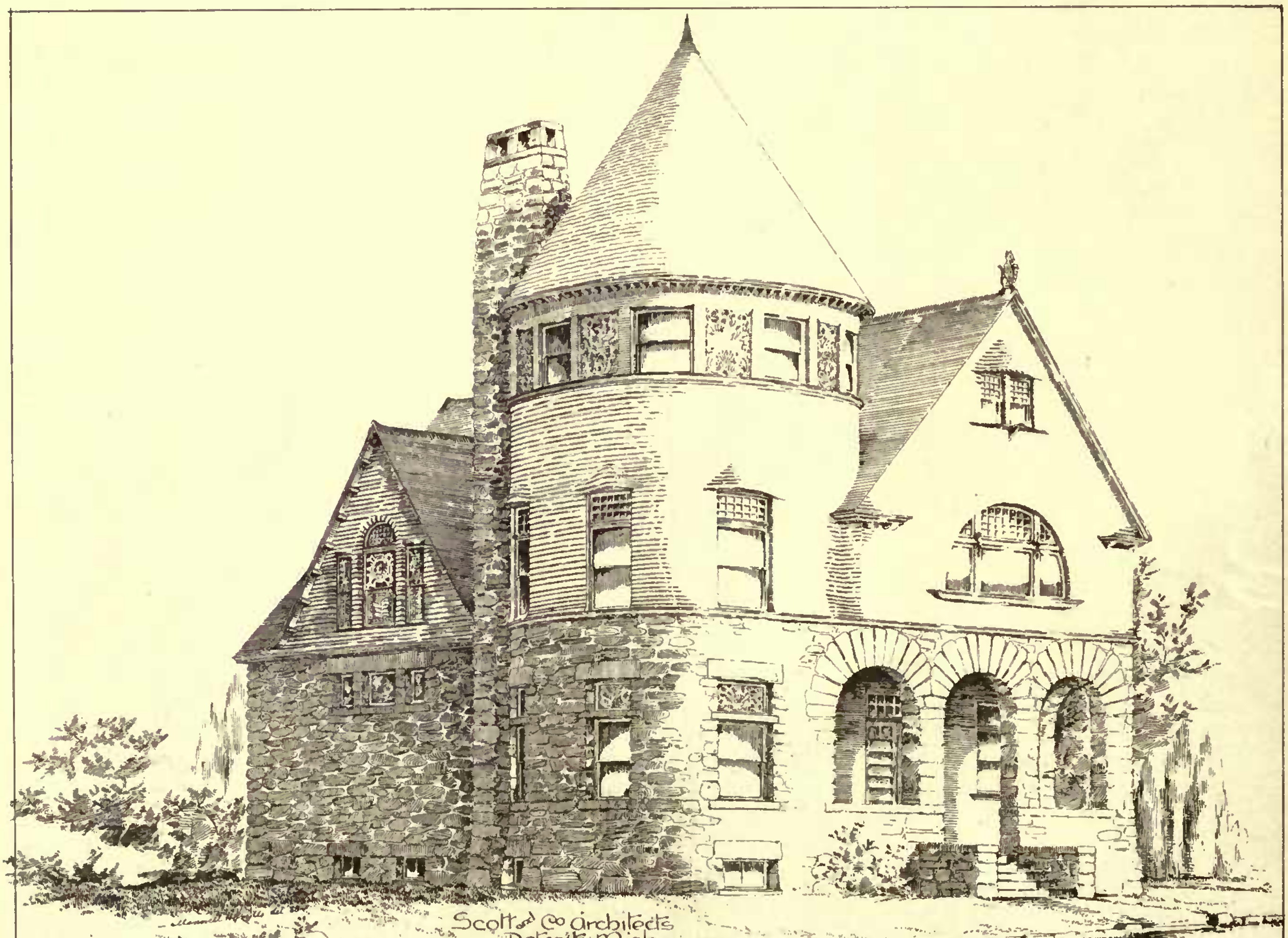
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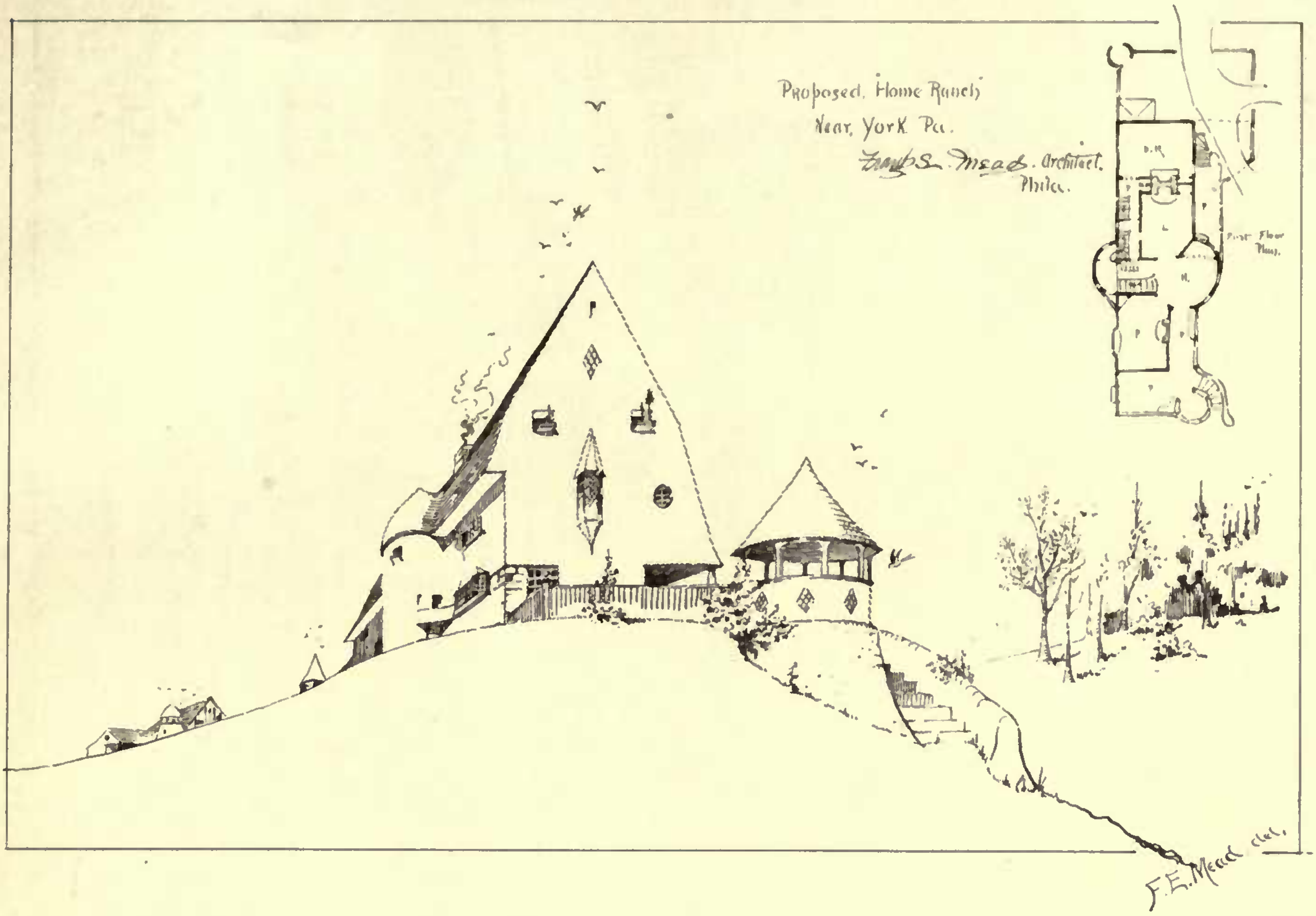


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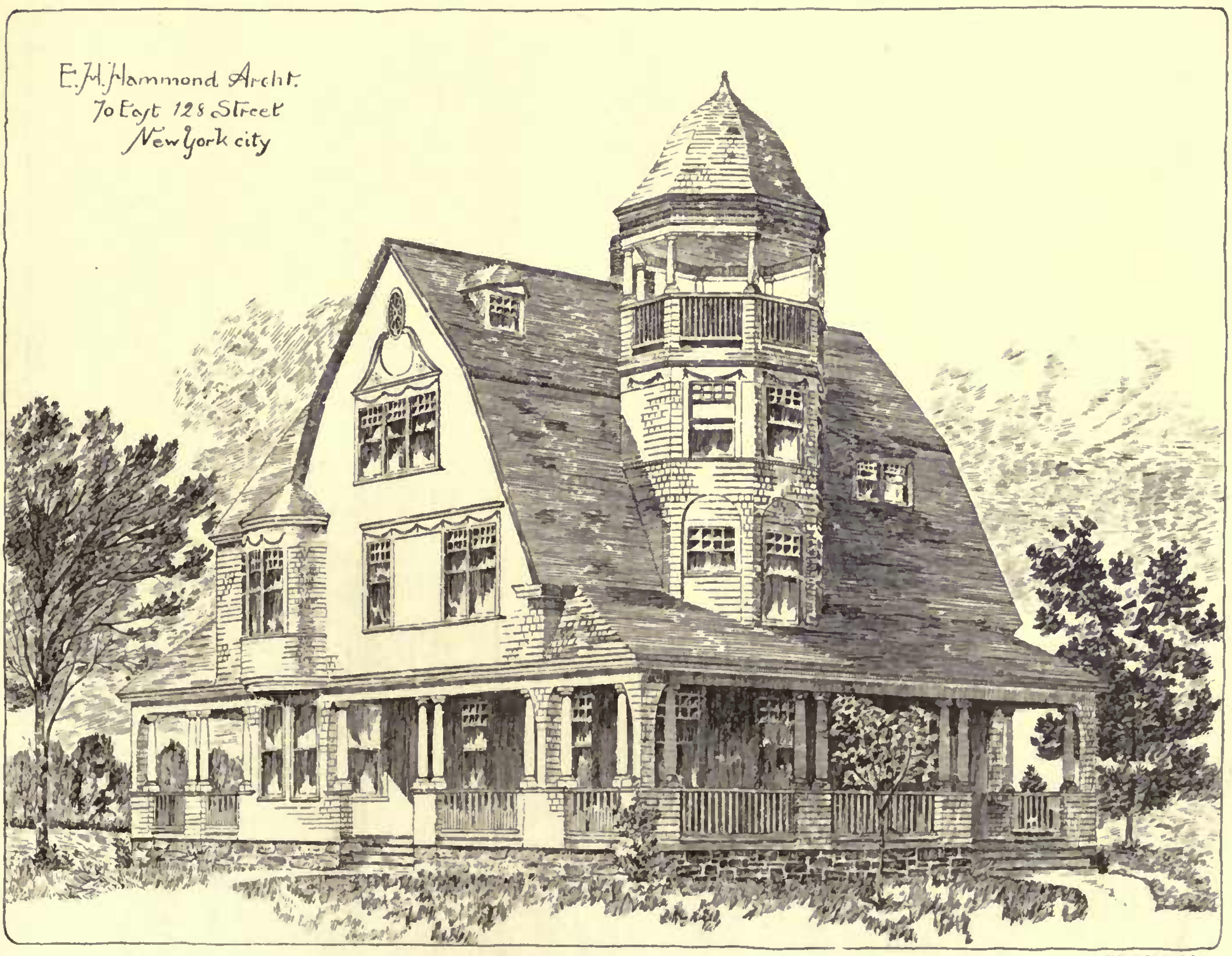




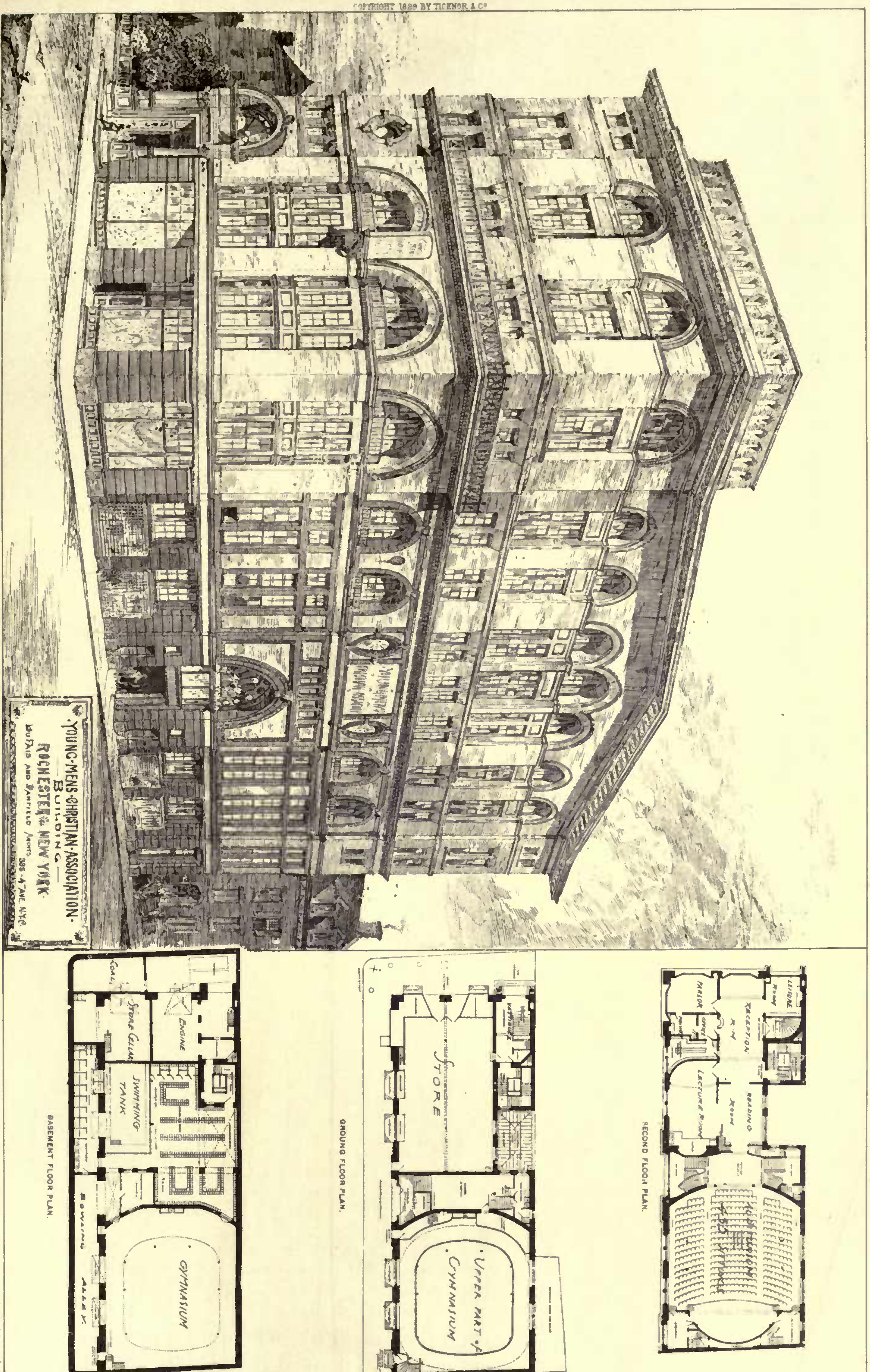
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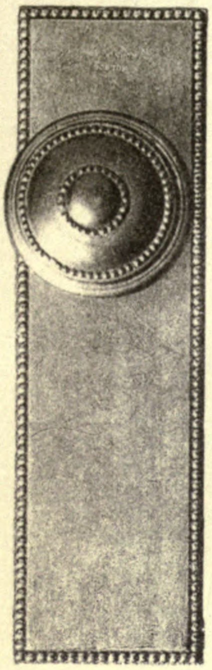
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Near, York Pa.
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First Floor Plan.
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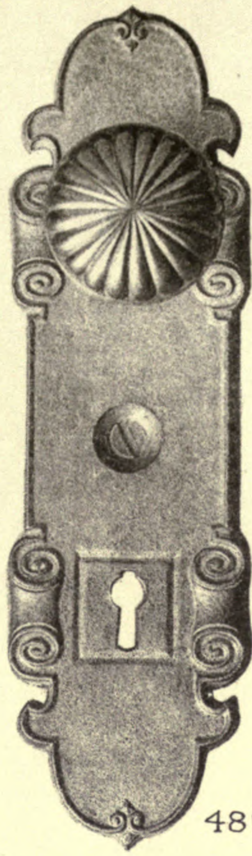
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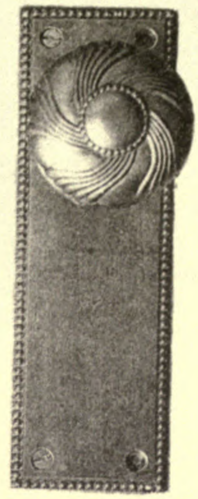
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Coal
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Gymnasium
Bowling Alley
Basement Floor Plan.
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Upper part of Gymnasium
Ground Floor Plan.
Parlor
Reception Rm
Lecture Room
Reading Room
Auditorium
Second Floor Plan.



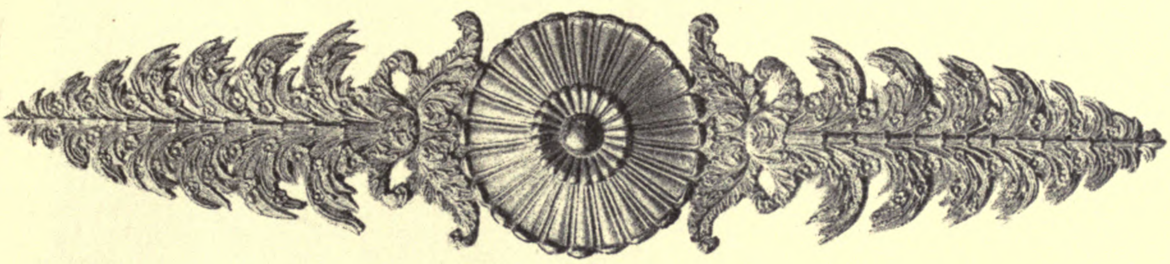
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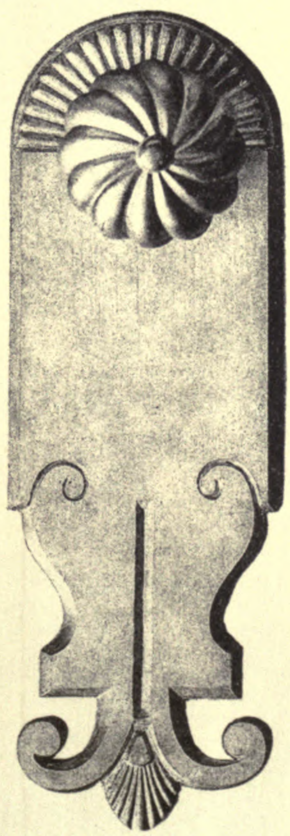
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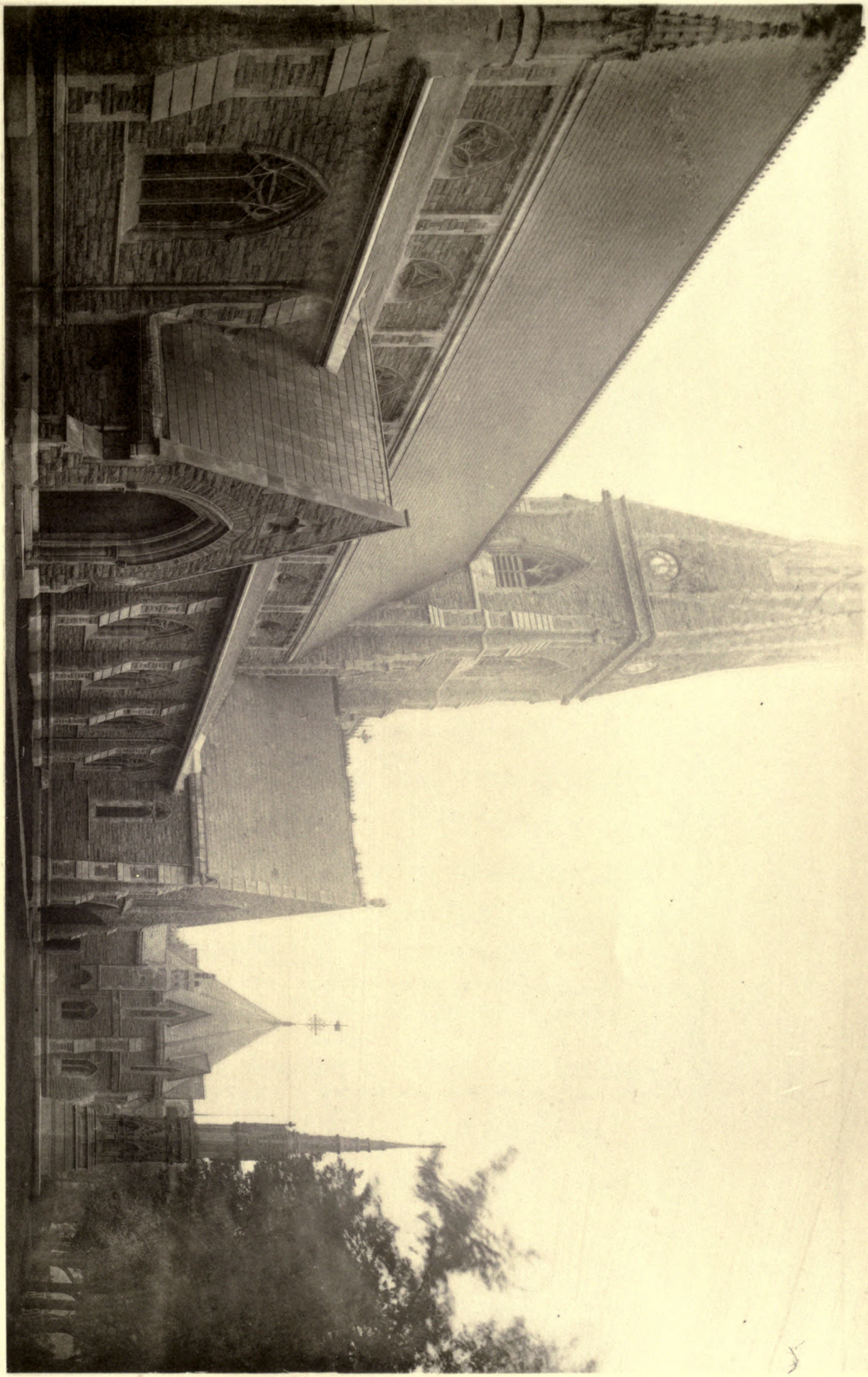


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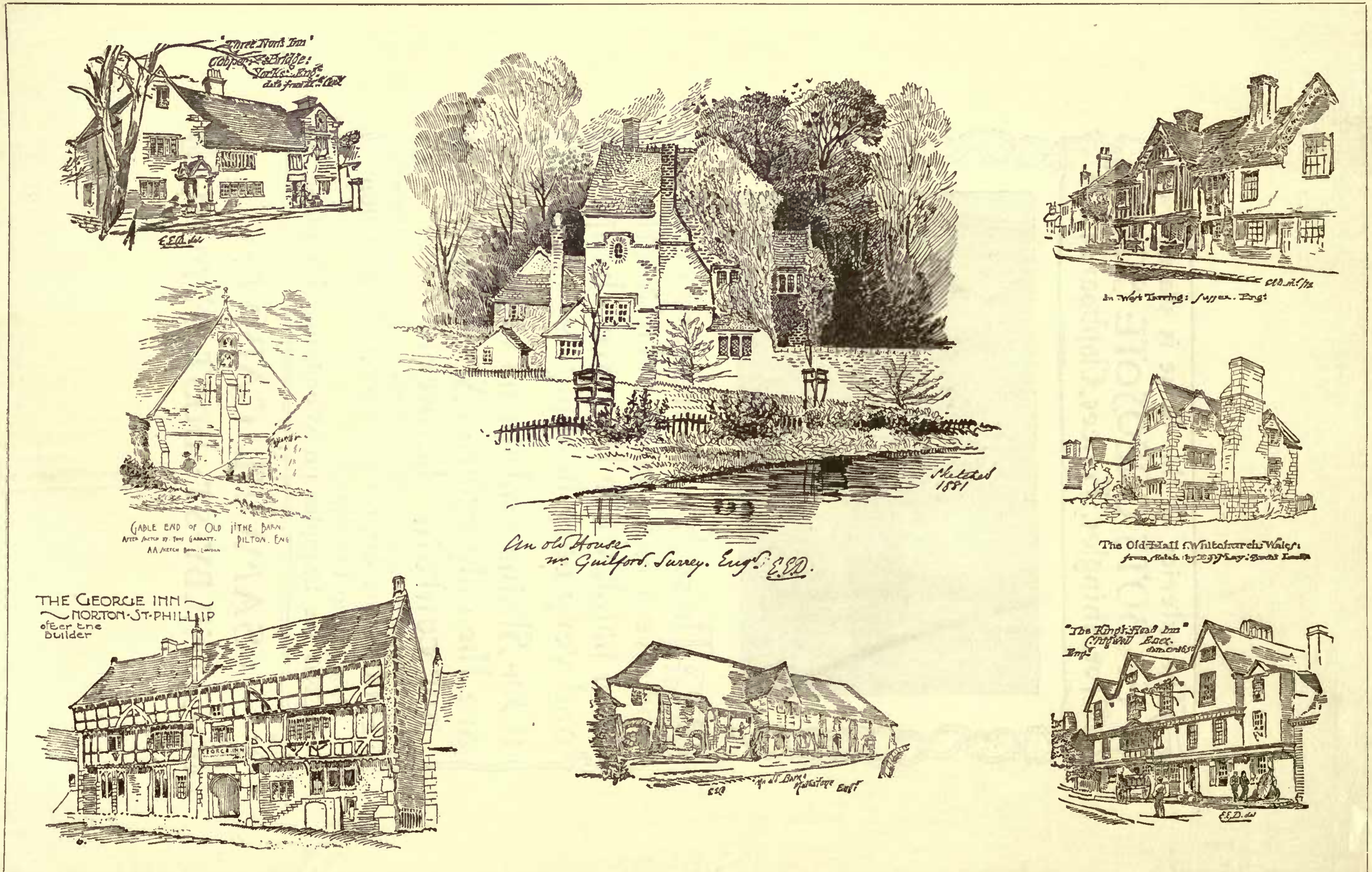
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OLD ENGLISH HOUSES.

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THE bridge-builders of the country recently held a national Convention, at which one of the subjects of discussion was the monopoly of the manufacture of iron rolled beams and channels now enjoyed here by a combination of nine or ten rolling-mills, the managers of which keep the price of their product at what seems to the bridge-builders an unreasonably high point. It seems, however, to have been easier to point out the objections to the monopoly than to find a remedy for it, and the convention adjourned, after passing some resolutions looking to the establishment of a new rolling-mill, to be operated by the bridge-builders for their own benefit. As the bridge-builders use a great deal of rolled iron, it might be worth while for them to make so large an investment as the establishment of a rolling-mill would involve, but we are rather surprised that none of the members of the Convention should have thought of proposing the engagement of a shop in Belgium in the interest of the American bridge-builders. Under Judge Gray's recent decision, it seems as if the construction which he put upon the tariff in regard to a framed floor would apply equally well to a bridge or roof, and that a bridge made and fitted in Belgium, out of beams, plates and channels costing a cent a pound or less, then taken apart and shipped here, would, even after paying an *ad valorem* duty of forty-five per cent, as a "manufacture" of iron, be far cheaper than the same thing constructed here of beams and channels at the combination price of nearly three cents a pound, and probably quite as cheap as if it were made out of iron rolled in the bridge-builders' own mill here; while a contract with a foreign shop to do, after the American manner, such work as might be confided to it, would involve no risk, and no investment of capital in an enterprise of very doubtful prudence.

A GOOD deal of criticism has been directed against the present Egyptian Government on account of its decision to abandon the famous Boulak Museum, in the suburbs of Cairo, and remove the collection which it contains, perhaps the most mysterious and interesting in the world, to what is described as a tumble-down old country-house in a desolate region on the other side of the Nile, near the Pyramids. To judge from the accounts which have appeared here, this decision was made by the Egyptian Government out of pure wantonness and disregard of the decencies of archæology and science, and we are glad to find, from a letter in *La Semaine des Constructeurs*, that the case is by no means so bad as it has been represented. It is true that the Boulak Museum is to be abandoned, but it is for the reason that the collection is now too large to be properly accommodated in the building, and is every day being increased through the interest which the Government takes in it. When it became evident that the present quarters would no longer suffice for the valuable objects which ought to be shown, the Minister of Public Works applied to the executive authority for permission to appropriate a neighboring estate, belonging to Djehlal Pacha, for the purpose of enlarging the Museum buildings, but, after a long discussion in the State Council, it was decided that the situation of Boulak did not in any case offer the convenience and isolation desirable for a great museum, and it would be better, instead of investing more money there, to sacrifice what had already been spent, and remove the collection to a place where it could be permanently and conveniently accommodated, with facilities for indefinite future enlargement. The villa of Ismail Pacha, although rather remote at present, offered the room and isolation necessary, and it was decided to transfer the collection to it. The Boulak Museum was the creation of Mariette Bey, who, on his death in 1881, was, by order of the Government, buried in the garden of the Museum, and a beautiful and stately monument erected over his grave. This monument, with the remains of the man whom it commemorates, is to be transported to the new location and set up in the same position relative to the buildings, so that no one can say that the Egyptian Government has shown any wanton carelessness of its precious collection or of the one to whom it owes most of it; and, as the Gizeh shore is soon to be connected with Cairo by a bridge, it may not be many years before the palace, which is now in the desert, will be the centre of a handsome suburb, and the foresight of the present ministry in securing so advantageous a location for the museum will be universally commended.

SOME of the people who write to the French architectural journals think that it is time for the architects to use their influence to have some of their number elected to the House of Deputies, on the ground that the lawyers and doctors are represented there, while the architects, who have quite as much experience in affairs as they, are neglected. There is certainly a good deal of sense in this. The President of France is a civil engineer, and a very good one, as well as the most sensible and judicious public man in the country, and one or two architects have gained high reputation and influence in the English Parliament; but it is curious to find that the French technical papers discourage the idea of connecting the profession with public life, on the ground that politics is a matter which interests only the more worthless and degraded citizens, and that an architect would cast very little credit on himself and his profession by having anything to do with it.

THE American Colony in Paris has presented to the city of Paris a reduced copy of Bartholdi's great Liberty statue, as a mark of gratitude and friendship, and the affair was inaugurated with considerable ceremony on the fourteenth of July. The place chosen for the statue is a curious, but very effective and appropriate one — the lower side of the bridge of Grenelle, in the middle of the Seine. It was, of course, hardly possible to obstruct the bridge itself with the monument, so a foundation was laid in the bed of the river beside one of the piers of the bridge, and a semicircular mass of stonework carried up, about fifty-five feet high, on which rests the pedestal of the statue. The pedestal is of white Jura limestone, rising about twenty-three feet above the roadway of the bridge, and decorated only with inscriptions and a few mouldings. The principal inscription is the one proposed by Vice-President Morton: "True friends are a better defence for a State than armies.

EVERY one has heard of the Prince of Monaco, who reigns with great dignity, when he is at home, over a community of seven thousand souls, but much prefers to sail about in his yacht, devoting himself to scientific investigations, which he carries on with an ardor and success which will probably make him the most famous of all his distinguished family. Among the peaceful exploits of the Prince, none are more conspicuous than his successful investigations into the natural history of the bottom of the sea, which have resulted in bringing to light, from regions where it was supposed that no life could exist, creatures of the most extraordinary character, huge, phosphorescent fishes, which illuminate the dark water

through which they swim, crustaceans and mollusks of new and unheard-of shapes. By a happy idea, the Pavilion of the Principality of Monaco at the Paris Exposition is in great part devoted to the display of the interesting apparatus used in his researches by the Prince, whose people seem pleased to identify themselves with his work, and thus share in the distinction which he has won. In the investigations of the Prince, which have extended from the banks of Newfoundland to the coast of Africa, one of the most important objects was originally the determination of the flow of ocean-currents in the North Atlantic, and many hundred floats have been sent out and thermometric observations at different depths taken, to ascertain, for instance, the movement of the Gulf Stream. Incidentally, it became necessary to make soundings at great depths, and an apparatus was invented by which not only the ocean was sounded with perfect accuracy in the deepest places, but thermometric observations of temperature were made at a depth of two miles from the surface. To make these observations, nothing was needed, in principle, but a long wire carrying a self-registering thermometer and a very heavy weight, several tons in some cases, secured in such a way as to detach itself on arriving at the bottom, and a delicate dynamometer, over which the wire ran, and which showed, by the sudden diminution of the strain, when the weight reached the ground; but when the attempt was made to bring living creatures from such depths, great difficulties were encountered, and overcome by most ingenious means. The cage in which the submarine animals were caught, according to *Le Génie Civil*, consisted in a cylinder of wire having three conical entrances, like those of a lobster-pot, and weighted, like the sounding wire, with detachable weights. It was, however, very unlikely that at these immense depths, where the darkness is practically total, any fishes would voluntarily find their way into the trap, and steps were taken to attract them by a light placed inside it. Obviously, no light was available but an electric light, but to get an electric light to burn a mile or two under water was not easy. To send the current from above was impracticable, as the friction of the thick, insulated wire would cause it to break before the trap could be drawn up, and the only resource was to supply the incandescent wire from a battery in the trap. Here, however, another difficulty appeared. The battery, which must be of considerable power, needed to be enclosed in a box of some kind, to keep it from being affected by the salt water, and as the hydrostatic pressure at such depths was six or seven hundred pounds to the square inch, it was found impossible to make a suitable box which was not crushed before it reached its destination. At last, however, this trouble was overcome by the curious device of connecting the box with a balloon. The balloon was made of cloth dipped in India-rubber, and so arranged that the air in it was in communication with that in the battery box. On sinking the apparatus, the hydrostatic pressure, being virtually uniform all around the balloon, compressed it equally on all sides, forcing the air out of it into the battery box, until the pressure inside the box and balloon exactly balanced the pressure outside. This process went on to any extent, so that at the bottom of the sea, although the balloon was reduced by the enormous force exerted on it to a small fraction of its original size, it still kept the internal and external pressures equal. On raising the apparatus again, it expanded as the pressure diminished, and brought the battery box to the surface uninjured. So successful was this device, that, not content with capturing deep-sea fishes with it, the Prince and his assistants propose on their next expedition to send down a photographic apparatus, and bring back negatives of the bottom of the ocean, as seen by the electric light.

A NEW cement, for securing iron into stone, is described in some of the foreign papers. The cement is made by melting rosin, and stirring in brick-dust, which must be finely ground and sifted, until a sort of putty is formed, which, however, runs easily while hot. In using, the iron is set into the hole in the stone prepared to receive it, and the melted putty poured in, until the space is filled; then, if desired, bits of brick, previously warmed, may be pushed into the mass, and a little of the cement thereby saved. As soon as the whole is cool, the iron will be firmly held to the stone, and the cement is quite durable, and uninjured by the weather, while, unlike lead and sulphur, it has no injurious effect on the iron.

EVERY one who reads of the Manchester Ship-Canal, which is to make the manufacturers of Manchester independent of the railways and of Liverpool dock-charges, by enabling steamships from New Orleans and Savannah to unload their cotton bales directly into the precincts of the mills, may not realize that the construction of the canal itself is a greater work than the Panama Canal, involving the removal of a larger volume of material than the whole amount to be excavated for the Panama Canal, including the famous cutting through the hill of Culebra, and requiring about as many locks, of about the same dimensions. Yet the Manchester Canal is under contract to be finished complete for about twenty-five million dollars, while the works at Panama, if they are ever carried through, will cost ten or twelve times as much, this enormous difference being chargeable in great part to the construction of the Gamboa dam, which will be necessary to keep the Chagres River from washing away the Panama Canal every year, and which has no counterpart at Manchester, while the rest is to be accounted for by the great cost of labor at Panama, the expense of the necessary financiering, the large salaries paid to attract the numerous corps of engineers and officials required to risk their lives in the climate of the Isthmus, and the outlay needed for terminal accommodations, hospitals and so on, and for the purchase of the Panama Railway.

THE *Builder* says that a floating theatre is to be constructed in St. Petersburg, consisting of a steamboat, on the American plan, with two decks, in which will be arranged a theatre, with seats for a thousand persons, besides accommodations for the actors, musicians and so on. The affair is intended to make trips on the long Russian rivers, giving performances at the large towns on the way. This would not be a bad idea for this country, which has plenty of long rivers, on whose banks are many towns capable of furnishing a paying audience for a theatre of a thousand seats, and the expenses of the company, both for transportation and maintenance, would be light compared with those incident to travelling by rail and living at hotels.

WE commend the following story, from the *Sanitary News*, to the attention of psychologists. It is reported, the story says, that a young man in Oxford, England, "possesses the hypnotic gift to a wonderful degree," and employs it in a manner which does credit to his business talent. When he has occasion to make a small purchase, he goes into a store, seeks out what he wants, then hypnotizes the salesman, apparently by looking at him, and lays down a penny. To the hypnotized salesman the penny appears to be a sovereign, and he hands the difference between the value of his purchase and a pound sterling to the accomplished young man, who walks off, considerably richer by the transaction. The principal witness of these singular performances seems to have been a policeman, who followed the youth for two weeks, in which his trick failed but once, and arrested him just as he had paid for a theatre ticket with a dirty piece of brown paper, and had received change for a five-pound note. It would be interesting to know how the warrant read on which the arrest was made. There is certainly no statute against hypnotism in England, unless the witchcraft laws of the time of Elizabeth cover the case; and if a shop-keeper, on merely being looked in the eye, chooses to give a man twenty-five dollars in exchange for a piece of brown paper, we do not see how the man can legally be prevented from taking it.

ALL architects, foreigners as well as Frenchmen, are invited to present designs in competition for the annual prize of the Société Académique d'Architecture de Lyon. The subject of the competition this year is an "Athénée Lyonnaise," or what we should perhaps call a lyceum. The building is to stand on a lot containing four thousand square metres, or about forty thousand square feet, surrounded on all sides by streets, and is to comprise a concert-hall, with rooms attached which can be rented for exhibitions, fairs, entertainments, and so on. The drawings must be received at Lyons before December 4, and the author of the best design will be rewarded with a gold medal and forty dollars in money. The second prize is a silver medal. The same society offers similar prizes for the best drawings of antique monuments or fragments of art from the region about Lyons, intending by this means to help to preserve from oblivion the beauties of objects which are now falling to decay, and will soon disappear.

SAFE BUILDING.[1]—XXXIII.

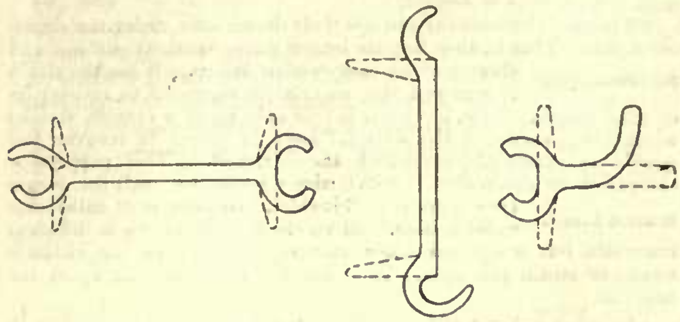
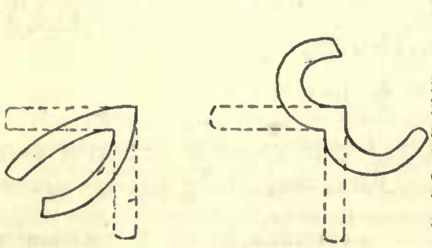



Fig. 161.

WITH wrought-iron the strength, according to Clay, increases with each rolling to the sixth; and then again decreases; or if the strength (tensional) of the muck-bar be = 1,0 then that of a piece piled and rolled three or four times = 1,36; and if six times = 1,41; decreasing again to = 1,0 at the twelfth re-working. This, however, as already

Effect of Re-rolling Wrought-iron.

stated is shown to be very doubtful with American irons, and largely dependent on tho nature of the muck-bar. Kirkaldy has shown that welding does not make as strong a joint as the original iron. He made some eighteen experiments on welded bars of wrought-iron from 1¼" to ¾" diameter, the result being that none were equal to the original strength. The maximum strength attained was 97,4 per cent; the minimum 56,2 per cent and the average was 80,62 per cent of the original strength. Welded joints should, therefore, be taken at only about four-fifths of the strength of iron in calculating for tension or transverse strains. It is usual, however, to call for sufficient extra metal in all welded joints, so that the pieces must invariably break elsewhere than at the joint, when tested.

In wrought-iron the skin seems to add some strength to the metal and for this reason, partly also on account of the more intricate interlacing of fibres in bar-iron, which is worked on all sides, bar-iron

Bar-iron Strongest.

is generally stronger than plate-iron; plate-iron being about 84 per cent of bar-iron. The plate-iron itself is always stronger with the grain than across it, resembling wood in this quality. Experiments have shown the tensile strength to be nearly 10 per cent greater along the grain, than across it. Shearing would show even greater difference, being some 25 per cent easier with the grain than across it.

Wrought-iron should always be heated before hammering or working.

Its tensile stress is greatly reduced by cold hammering; experiments (according to Box) showing the reduction to be

a loss of 32 per cent if 2" thick
a loss of 36 per cent if 1½" thick
a loss of 13 per cent if 1" thick

or an average loss of 27 per cent by cold hammering.

Effect of Cold Rolling.

By annealing the iron the strength can be partially restored but not entirely, the loss in the above experiment still being after the annealing

some 14 per cent in the 2" thick iron
somo 4 per cent in the 1½" thick iron
some 8,6 per cent in the 1" thick iron

or an average loss of about 9 per cent.

Unwin, however, claims the exact opposite. According to tests quoted by him, wrought-iron and mild steel increase in tensional strength and have a greater elastic limit, if worked cold, but suffer a large loss in ductility. The working however must be uniform on all parts and not local otherwise the material is weakened by uneven resistance. Annealing, according to Unwin, removes the effects of cold rolling or cold working and should be used where this is only local or on certain parts, as in the case of punching of rivet holes, where the part around the hole is hardened by cold hammering and the rest left unhardened. He cites the process of wire-drawing, which is similar to cold rolling and certainly adds greatly to the tensional strength of the material.

He finds one very curious fact, however, and that is that while

Avoid Blue-heat.

neither cold nor hot working hurts wrought-iron or mild steel, working them at an intermediate or "blue-heat," that is at about 470° to 600° F., is positively harmful. In many tests it was found that samples of either, about ⅜ inches thick, could be bent back and forth on an average some twenty times, without breaking, if they were either cold or red hot. But if heated to an intermediate blue-heat they all broke readily after being bent back and forth only two or three times. Annealing ordinary wrought-iron means a loss of from 5 per cent to 10 per cent in tensile strength. The strength is not affected, however, by low temperatures nor ordinary variations in temperature, nor very much at higher temperatures. At high temperatures up to from 600° to 900° F. the tensile strength of wrought-iron increases somewhat. Beyond this it decreases rapidly. Pure wrought-iron will increase up to a higher temperature than impure iron. Neither cast-iron nor steel are affected much by low temperature nor the ordinary variations in same.

With steel the tensional, transverse and compressive stresses vary

Steel varies with carbon in strength.

greatly with the composition of the material. As already stated the more carbon it contains, the less elastic, but the harder is the steel, while the less carbon it contains, tho more elastic, but less hard will it be. The ultimate limits for tension per square inch are given in Table IV from 42000 pounds to 108000 pounds and for compression from 90000 pounds to 150000 pounds, all per square inch.

Steel like wrought-iron is stronger in bars than in plates (plate-steel being about 80 per cent of bar-steel), and is stronger with the grain than across it. The proportions for tension and shearing across or along the grain being about the same in steel, as in the wrought-iron. In regard to re-working, according to Mr. Clay, the strength of steel is increased to the fourth piling, and then declines, until at the seventh re-working it is weaker than after the first working. Or, if the tensional strength of the first working is = 1,0 the fourth is = 1,253 and the seventh = 0,94. This, however, is quite as dubious as the advantage of re-working wrought-iron very often. Welded joints in steel are very much weaker than the original metal, having only some 40 per cent to 55 per cent of the strength of the unwelded parts.

If steel plates are worked cold they lose strength greatly. (Unwin, however, denies this for mild steel if working is uniform). Punch-

Do not punch steel cold.

ing them cold decreases their tensional strength some 33 per cent, if very hard steel; the milder the steel the less will the loss be. But this loss can be restored again by annealing after punching. Annealing instead of damaging steel plates greatly increases their tensional strength, particularly if the steel is very hard, adding some 50 per cent to same. But is of slight, if any, advantage in mild steel. But after all said, the only sure method for the architect to pursue is to make careful tests to see whether the material possesses the necessary qualities and strengths he desires. Chemical tests should therefore give way to practical tests.

The tensional or compressive ultimate strength can be readily as-

Tests for strength.

certained by testing small pieces in testing-machines, and making proper allowances for the differences in sizes of test-pieces and full-size members. These machines are of various sorts, but generally by hydraulic power or weights, greatly increased by leverage or screw-action, they tear small specimens apart, or else crush them, the effects on the pieces being carefully noted and recorded. Some of the machines make automatic records. The kind of machine used is not so essential to the architect so long as he has ascertained its reliability. From the tensional and compressive ultimate strength the cross-breaking strength of the specimen can be calculated; or the modulus of rupture can be obtained by breaking specimens across with centre loads and calculating the modulus of rupture by the following Formula:

Modulus of rupture from tests.

$$k = \frac{3}{2} \cdot \frac{w.l}{b.d^2} \qquad (102)$$

Where k = the ultimate modulus of rupture of a material, per square inch.

Where w = the load or amount of pressure, in pounds, applied at the centre, required to break a specimen of rectangular cross-section, lying on two supports.

Where l = the clear length, in inches, between supports.

Where b = the width of specimen, in inches, measured (across the specimen) at right angles to the line of pressure.

Where d = the depth of specimen, in inches, measured along the line of pressure.

Where the test specimen is exactly square in cross-section and of one square inch area, that is one inch by one inch, and where the supports are exactly twelve inches apart, and the load or pressure applied in the centre, the modulus of rupture will always be eighteen times the load or pressure, or:

$$k = 18.w \qquad (103)$$

Where k = the ultimate modulus of rupture of a material, per square inch.

Where w = the load of pressure, in pounds, applied at the centre, required to break a test specimen, of one inch by one inch (square) cross-section, lying on supports exactly twelve inches apart.

The shearing strength is generally found by direct tests.

Test specimens of steel, wrought or cast iron, should never be

Shear off test specimens.

broken off suddenly, or by blows; nor should they be jarred, as otherwise the fibres crystallize more or less and this greatly affects the result. They should be carefully planed off in the machine-shop.

Another important point is to be sure to have all test specimens, when not sheared off the actual pieces being used, of the same material and general thickness as the pieces.

In cast-iron, frequently, test-pieces are cast on to each piece, these are broken off and tested. They should not be broken off, however,

[1] Continued from page 64, No. 711

except in the presence of the architect or his inspector. If they are of the same thickness as the piece, they offer a fair test; if, however, they are much smaller and thinner than the piece no reliance can be placed on the result.

In wrought-iron and steel it is best to roll the pieces a little too long and shear off the superfluous ends for testing.

Besides the tests as to strength there are many tests resorted to, to ascertain approximately the quality of the material. A few will be given here.

Other Tests.

If cast-iron be struck on its edge a sharp blow with a chisel or hammer, it is of soft and good quality if it can be indented. If it breaks it is very hard and brittle. If it rings out clearly, it is a good casting; if the sound is dull it is full of sand-holes, air-bubbles or flaws.

If the surface is smooth, even and hard, and the edges sharp and perfect it is a good casting. If the edges or surfaces are uneven and wavy it is an indication of unequal shrinkage and cooling or more likely unskilful ramming of the sand in the flask around the pattern or mould. If hollow pieces, when tapped, show uneven thicknesses on opposite sides the core has sagged or floated in the mould.[1]

In iron and steel the principal tests resorted to are for tensional strength, elasticity, ductility and limit of elasticity. These will be explained presently. The nature of the material can also be more or less ascertained by fracture and bending. It is almost impossible, however, to distinguish mild steel from wrought-iron excepting by tests for strength, and to ascertain whether or no they can be hardened or tempered, as already explained.

Condition of Fracture.

If specimens of iron or steel on fracture show a close, silky, fibrous grain, with few bright or crystaline specks the metal is good. If there are many crystals in the fracture, and particularly if they are coarse and large, and there are great "blotches" of color, or other evident impurities, the metal is poor. The color of the fibres is grey, that of crystals of a bright silvery aspect. It must be always remembered, however, to get the fracture by shearing, or by slow bending, when cold, otherwise crystals will be formed while testing.

Bending Tests.

Specimens are frequently nicked and then bent cold until fractured, in such cases there will usually be a large percentage of crystals close to the nicked part, but none in the other half. All iron should be required to be free from all visible seams, blisters, buckles, cinder spots or imperfect edges.

If iron or steel pieces on fracture show the seams where the different layers have been piled and rolled together, that is, if the seams open perceptibly and are very marked, the metal is badly rolled or united. If these seams can be distinctly seen by the naked eye before fracture, the quality is even poorer.

Acid Tests.

If iron or steel for a few hours be immersed in or wetted with some strong acid, such as either nitric, muriatic or sulphuric acid, the parts between the fibres will be eaten away, and the latter will be distinctly exposed. The architect can then readily judge of the nature of the rolling or working, whether the layers (or piles) are thoroughly worked together, and whether the fibres are close and all thoroughly interlaced.

Good wrought-iron should be capable of being bent double, without fracture, *while cold*, over a cylinder of diameter equal to twice the thickness of the piece. The iron should not crack under this test. If nicked, and then bent double suddenly by a blow from a sledge hammer the fracture should show but a small proportion of crystals and these nearer the nicked edge.

Beams, channels, angles and tees should be capable of having their flanges or legs bent, that is rolled up longitudinally and away from the web or other leg without opening the inside joint between web and flanges, or between legs. In practice, however, the iron usually furnished by the mills will not stand so severe a test. Its quality will be in proportion to its ability to stand this severe test.

Figure 161 shows a few illustrations of such bending tests, the dotted lines showing outlines of original sections, before bending.

Tests for mild steel should be the same as for wrought-iron.

Ductility and Elasticity.

Ductility and elasticity are the same practically as stretching. If the material has high ductility its cross-section will be diminished greatly, when stretched, before breaking. If it has great elasticity it will stretch greatly, that is, become much longer before breaking.

Wrought-iron should be allowed a stretch $= \frac{1}{225}$ of an inch for each foot of length of specimen if subjected to a tensional strain of 10000 pounds, per square inch. Every important tensional piece should be tested up to 10000 pounds, per square inch. Those elongating more should be condemned. On removing the strain the piece should recover its original length exactly.

Safe strains in testing.

Test pieces should be strained up to 18000 pounds, per square inch, for compression and should then recover their original thickness, they should not crush completely under 36000 pounds, per square inch. Compression test-pieces must, of course, be short blocks or cubes. They should stand at least 25000 pounds, per square inch, in tension without losing their capacity for recovering their original length, and should not tear apart under less than 50000 pounds tension, per square inch for small sections; if sections or plates are large they should stand at least 46000 pounds tension.

[1] A skilful moulder will arrange vent-holes and spaces so in the mould as to avoid dirt and blow-holes, no matter what the shape of the piece.

For steel the above limits must be varied, according to whether mild or hard steel is desired.

All metals, theoretically change their dimensions under the slightest strain. That is, they become longer under tensional strains, and shorter under compressive strains.

Permanent Set.

When the strain is removed the material is supposed to recover its original length. This, however, is true only up to a certain strain; when this is exceeded the material loses its power to recover and remains permanently elongated or shortened. This permanent elongation or shortening is called the "*permanent set*," the strain (per square inch) which produces it is called the "*elastic limit*."

Elastic Limit.

This elastic limit varies in different materials, but is approximately at about *one-half* of the ultimate strain, or strain per square inch that will crush or tear apart the material.

Table XXX gives the amount of extension and contraction, in inches, for different strains, of cast-iron and wrought-iron pieces, if each piece were one hundred feet long.

TABLE XXX.

Amount of Extension and Contraction, in inches, of Cast a
Wrought Iron Bars, 100 ft. long, under different strains.

Strain, per square inch, in pounds.	CAST IRON.		WROUGHT IRO
	Extension, under tension.	Contraction, under compression.	Extension, under sion or contracti under compressi
1000	0,08308	0,09155	0,0444
2000	0,17150	0,18404	0,0889
3000	0,26528	0,27747	0,1333
4000	0,36442	0,37185	0,1778
5000	0,46890	0,46715	0,2222
6000	0,57874	0,56341	0,2667
7000	0,69392	0,66061	0,3111
8000	0,81446	0,75875	0,3556
9000	0,94036	0,85782	0,4000
10000	1,07160	0,95784	0,4444
11000	1,20820	1,05880	0,4889
12000	1,35014	1,16070	0,5333
13000	1,49744	1,26354	0,5778
14000	1,65010	1,36733	0,6222
15000	1,80810	1,47205	0,6667
16000		1,57871	0,7111
17000		1,68432	0,7556
18000		1,79186	0,8000
19000		1,90035	0,8444
20000		2,00978	0,8889
21000		2,11994	0,9333
22000		2,23145	0,9778
23000		2,34370	1,0222
24000		2,45690	1,0667
25000		2,57102	1,1111

In very hard materials it is more than half the strain, for such materials not being elastic, will stretch (or shorten) but very little and will not show appreciable variation until a high strain is reached, when they show a set quickly, and break soon after. In soft, elastic, ductile materials they begin showing permanent stretching (or shortening) very early and continue to do so for a long time before breaking. The following will be quite safe to follow as general guides.

For cast-iron the elastic limit is about $\frac{1}{3}$ of the ultimate tensional or compressive stress.

For wrought-iron the elastic limit is about $\frac{1}{2}$ of the ultimate tensional or compressive stress in bars, and about $\frac{3}{5}$ in plates.

For mild steel the elastic limit is about $\frac{9}{20}$ and from this it varies to about $\frac{4}{5}$ for

Hard steel — both, of course, of either the ultimate tensional or compressive stress.

Up to the elastic limit it is supposed that the amount of stretch (or shortening) is exactly proportional to the amount of strain, and that the material will recover its exact original length. Reference is here made to Formula (88). Neither of the above suppositions are exactly true, though in wrought-iron and mild-steels it is very nearly so. Cast-iron, however, is very variable in its extensions or contractions under strains; and all three show more or less "fatigue" and permanent set, under variable, or oft-repeated (on-and-off), or prolonged strains.

Box treats this subject very fully.

Extension of Cast-iron. He finds the extension of cast-iron, subjected to tensional strains, to be:

$$e = \frac{L}{10000000} \cdot (8{,}04.w + 0{,}0002676.w^2) \qquad (104)$$

Where e = the total amount of extension, in inches, of a piece of cast-iron, subjected to tensional strains.

Where L = the original length, in feet, of the piece of cast-iron.

Where w = the tensional strain, in pounds, per square inch, of cross-section of the cast-iron piece.

Table XXXI gives the length of piece required to stretch or contract exactly one inch under different strains.

TABLE XXXI.

Length of Cast or Wrought Iron Bars, in feet, that will stretch or contract exactly one inch under different strains.

Strain, in pounds, per square inch.	CAST IRON. Length, in feet, to extend one inch.	CAST IRON. Length, in feet, to shorten one inch.	WROUGHT IRON. Length, in feet, to either extend or shorten one inch.
1000	1204	1094	2250
2000	583	543	1125
3000	377	360	750
4000	274	269	562
5000	213	214	450
6000	173	177	375
7000	144	151	321
8000	123	132	281
9000	106	117	250
10000	93	104	225
11000	83	94	204
12000	74	86	187
13000	67	79	173
14000	61	73	161
15000	55	68	150
16000		63	141
17000		59	132
18000		56	125
19000		53	118
20000		50	112
21000		47	107
22000		45	102
23000		43	98
24000		41	94
25000		40	90

It will be readily seen, that the increase in extension is in a higher ratio than the increase in strain, which is due, as already said, to the very defective elasticity of cast-iron.

For compressive strains in cast-iron, Box's researches give the following Formula:

Contraction of Cast-iron.

$$c = \frac{L}{10000000} \cdot (9{,}108.w + 0{,}000047044.w^2) \qquad (105)$$

Where c = the total amount of shortening, in inches, of a piece of cast-iron, subjected to compression strains.

Where L = the original length, in feet, of the piece of cast-iron.

Where w = the compression strain, in pounds, per square inch, of cross-section of the cast-iron piece.

Of course, in either case the extension or contraction from changes of temperature will be independent of the above.

By comparing these formulæ it will be seen that cast-iron yields more readily, that is, shortens more in proportion under very small compressive strains, than it extends under small tensional strains. But as the strains become greater the amount of shortening and extension become more nearly equal; they are exactly equal for strains of 4842 pounds per square inch, while for greater strains the amount of extension from tensional strains is greater than the amount of compression from the same compressive strain. With wrought-iron and mild-steel the compression under small strains is even in a much more marked ratio than under small tensional strains owing to the "flowing" of the metal under compressive strains. There are no reliable experiments recorded, however, on which any formulæ could be based for wrought-iron, it may be safely assumed, however, to be perfectly elastic up to 18000 pounds, (per square inch), compressive strain and 25000 pounds, (per square inch), tensional strain. With heavier strains the shortening or lengthening will be in very much quicker ratio than the increase in their respective strains. With steel it will depend upon its nature. Mild steel will approximate nearly to the perfect elasticity of wrought-iron, under safe strains, while hard steels will become more imperfect in elasticity the nearer they approximate the nature of cast-iron.

Time plays a very important part in considering the final effect on metals of any strain.

Time Tests. It has been found that a moderate strain on a bar, if left on a long time, will gradually increase its effect, either extending it more and more as time passes on, or shortening it more and more. This is known as the "fatigue" of the metal.

If the strain is within the elastic limit the increase in "set" will continue for a long time, but will finally become so infinitesimally small, as to be practically nothing. If, however, the strain is beyond the limit of elasticity the set will continue to grow and the piece will frequently break after many years under a strain which was considered well within the original ultimate breaking strength, but which, as time passed, fatigued, that is tired out, the material. Severe strains should therefore never be borne for a lengthened period, but should only be imposed for short periods, and they should be well within the elastic limit, to give the metal a chance to recover from the set produced by such strains.

Intermittent Strains. Oft-repeated strains, even where put on entirely without shock, greatly weaken a material. It has been found that a load, which originally was borne with perfect safety, will, if often removed and replaced, finally break the piece.

Planat concludes by comparing many experiments on fatigue of iron: that if a strain of 58700 pounds, per square inch, can be repeated 170000 times before breaking a test piece, the same piece will break under a strain of only 48000 pounds, per square inch, if repeated 480000 times; or under a strain of 42700 pounds, per square inch, if repeated 1320000 times; or under a strain of 38400 pounds, per square inch, if repeated 4035000 times; while a strain of 32000 pounds can be repeated forever and would never break the piece.

These experiments were made by A. Wöhler and confirmed by Spangenberg, Baker, Baushinger and others: they are usually carried out by means of revolving wheels or by pistons which alternately put on and remove the strain, the number of revolutions or pressures being carefully computed. Piston-rods of engines offer good examples of oft-repeated off-and-on loads, or the driving-rods of locomotives, in fact many parts of machinery.

Impact or Rolling loads. Where a load is put on suddenly, with shock, that is falls on, or is forced on, suddenly without regard to whether it jars or not, the effect is practically double that of a stationary (static) or dead load. This is called "impact." The subject is too extensive to enter into here, the actual effect on the beam depending upon the length of span, height of fall, and permanent load; but it will be safe enough in all such cases to simply double the factor-of-safety, or in other words allow only one-half of the safe-stress, that would be allowed for an intermittent load put on without shock. Rolling loads are considered the same as loads put on with shock; the effect depending, of course, on the velocity; all such loads, moving, rolling, jarring, etc., are called dynamic as opposed to static or dead loads.

Reversed Intermittent Strains. If the strain is reversed at each application, that is alternately tension and then compression, the effect is equal to the sum of both, that is, double that of the same amount of strain if not reversed. To break anything we instinctively bend it one way and then the other, by doing this we reverse the strains in the fibres from compression to tension and vice-versa at each bend, the result being that the piece soon breaks.

Box has combined these rules in a Table, which is here given as Table XXXII.

By combining this table with the safe stresses given in Tables IV and V, that is taking whatever part of the safe-stress there given for dead loads, that the nature of the load demands, we can obtain the safe-stress under any manner of loading. Where stresses in opposite directions take place, the material will yield in the direction of the weakest stress.

TABLE XXXII.

ULTIMATE BREAKING STRENGTH OF MATERIALS UNDER DIFFERENT KINDS OF STRAINS.

Material.	If Dead Load (Static).	Intermittent Loads (off-and-on continuously.) If in one direction only. Without shock.	Rolling (dynamic).	If in opposite directions. Without shock.	Rolling (dynamic).
Wrought Iron and Steel.	1	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{6}$
Wrought Copper and Brass, also Slate, Timber, Masonry, etc.	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$
Cast metals: Iron, Copper, Brass, Lead, etc.	1	$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{12}$

How to use Table XXXII. Thus, if we have a bar of American cast-iron, according to Table IV it will be safe under a steady (static) compressive strain of 15000 pounds, per square inch, or a steady tensional strain of 2500 pounds, per square inch.

If the compressive strain were constantly and entirely removed and then put on again, but without shock, it would be safe, according to Table XXXII, to use but $\frac{1}{3}$ of this amount of 5000 pounds, per square inch; while under the same circumstances only 833 pounds would be safe in tension. If the strain were constantly removed and then put on again with shock, that is suddenly, or kept moving, only one-sixth would be safe or 2500 pounds per square inch, in compression, and 417 pounds in tension.

If the strain were alternately compression and then tension, but put on without shock the same strains would be safe; the safe strength of the bar would, therefore, be measured by the weaker of the two and would be only 417 pounds, per square inch. If the strains alternated between compression and tension and besides this were dynamic (put on suddenly) only one twelfth would be safe or 1250 pounds in compression and 209 pounds in tension, both per square inch. The strength of the bar under these circumstances would, therefore, be only 209 pounds, per square inch.

For wrought-iron we have the same safe-stress, whether in tension or compression; for a dead, constant load we should use then, from Table IV, 12000 pounds, per square inch; from Table XXXII we should have for intermittent loads, in one direction only, that is of the same nature, but put on-and-off continuously, but without shock, two-thirds or 8000 pounds, per square inch. If put on-and-off suddenly 4000 pounds, per square inch. The same if constantly reversed from compression to tension but done slowly and without shock. If constantly reversed and it is done suddenly or with shock the safe strain per square inch would be only 2000 pounds.

[To be continued.]

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE ON EAST FIFTY-THIRD STREET, NEW YORK, N. Y.

[Gelatine Print, issued only with the Imperial Edition.]

INTERIOR OF BAMBERG CATHEDRAL, BAVARIA.

This plate is copied from "*Le Moyen Age Monumentale et Archeologique*," in connection with the article on "Equestrian Monuments," elsewhere in this issue.

DESIGN FOR THE MONUMENT TO THE CONSTITUTIONAL ASSEMBLY. J. P. AUBÉ, SCULPTOR.

See article on "Aubé," elsewhere in this issue.

STATUE OF SHAKESPEARE. — STATUE OF MICHEL LALLIER. J. P. AUBÉ, SCULPTOR.

See article on "Aubé," elsewhere in this issue.

HOUSE OF J. E. WARE, ESQ., ANNISTON, ALA. MESSRS. CHISHOLM & GREEN, ARCHITECTS, ANNISTON, ALA.

The cost of this house was about $7,000.

THE HAMMOND BUILDING, DETROIT, MICH. MR. GEORGE H. EDBROOKE, ARCHITECT, NEW YORK, N. Y.

AN INTERIOR. MESSRS. BRIGHAM & SPOFFORD, ARCHITECTS, BOSTON, MASS.

EQUESTRIAN MONUMENTS.[1] — XIX.

THE CRUSADERS.

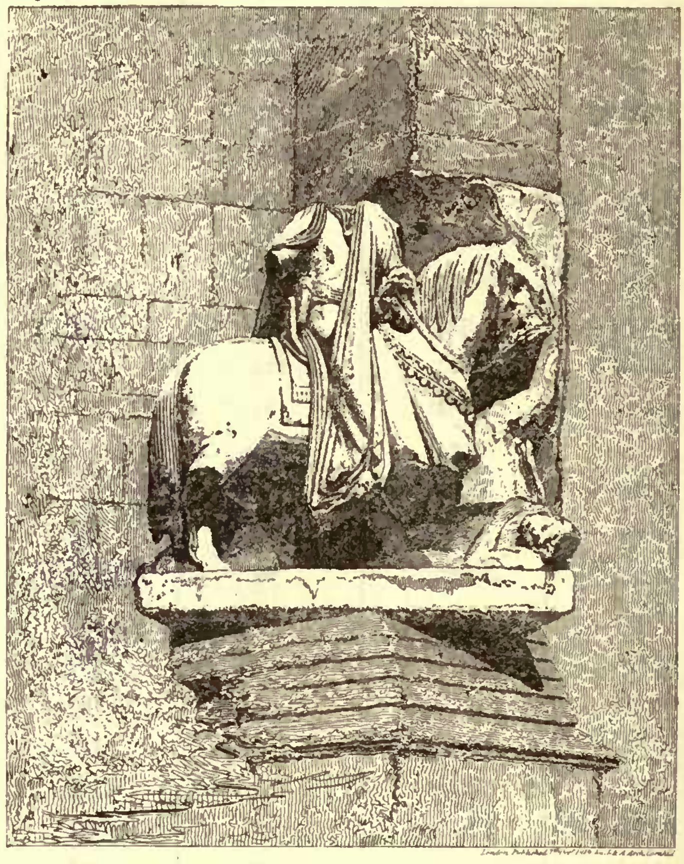


Trajan and the Widow. From the Ducal Palace, Venice.

It has been most natural in following up this subject of equestrian sculpture in fairly chronological sequence to pass over temporarily an historical epoch of very great interest for the sake of discussing some of the works of the Renaissance period which represented personages of the times. Thus it is that the statues of the *condottieri* have been described, while those earlier and still more interesting warriors, the Crusaders, have been for the moment neglected.

Thanks to the genius of Sir Walter Scott and other romancers the crusader is an heroic entity to every one in his youth, and it is not always that one finds time to correct the conception formed at an impressionable age by a closer study of history in riper years. So long as Scott is read, it will be useless for historians to attempt to prove that Richard Cœur de Lion was little more than a brutal bully; the belief that he was a chivalrous knight of noble personal character is too deeply instilled: and, in like way, we all are ready to believe that the personages whom we now find commemorated, here and there, by recumbent sculptured effigies with legs crossed at the ankle, the leg or the knee — according as the defunct crusader had taken part in one or more crusades — were most noble and praiseworthy individuals during their lifetime. And so, doubtless, they were, for times have changed and it is hardly fair to apply the moral code of the nineteenth century to the actions of individuals who lived in the eleventh and twelfth.

It is not necessary to our purpose to even sketch the history of the very complicated events in which our subjects played a part. It



William the Conqueror, St. Etienne, Caen. From Cotman's "*Antiquities of Normandy*."

would take too much space to describe how widespread religious enthusiasm was awakened; how the early attempts resulted in the wasting and destruction of the undisciplined hordes before even they could set foot beyond the confines of Europe; how later attempts under abler leaders succeeded better; how Jerusalem was actually delivered, then lost and, after many scores of years, again freed for a short time from the polluting control of the infidel; how enthusiasm was fostered and a spirit of unrest fomented by wily popes, who found their temporal power and possessions vastly increased by the simple process of acting as mortgagee — and care was taken that only "grab mortgages" were taken — for the many princes and and leaders who could maintain their forces in the field — forces raised for the glory and extension of the true faith — only by pledging their patrimony to the Church, who Jesuitically rewarded

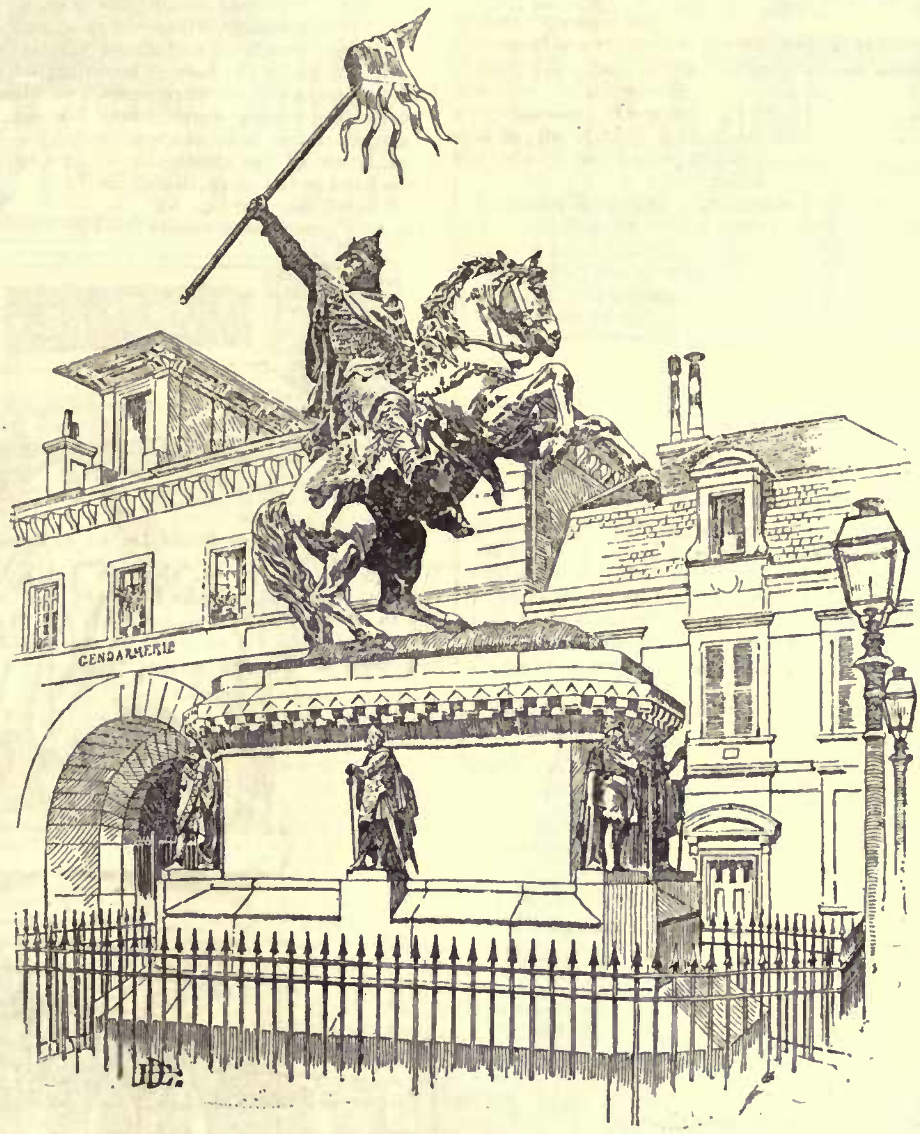
[1] Continued from page 27, No. 708.

their enthusiastic self-devotion on true cold-blooded business principles.

All Europe was in arms, and armed forces on the road to Palestine often met opposition from armed forces on the road thither, or gave occasion for those who staid at home to pay off old scores, by attacking the possessions of those who had left insufficient forces to guard them while crusading in Holy Land. It was not a time when the arts of peace could flourish, and it is small wonder that of contemporary sculpture there is so little.

There now exist quite a number of equestrian monuments erected to the honor of some crusader, but they are mostly the idealizations of sculptors of a later day, and so do not have the interest that attaches to the contemporary portrait statues of the *condottieri*. The only exception to this statement is found at Bamberg, where, in the cathedral, supported upon brackets against a pier of the nave, stands an equestrian statue of Conrad III, Emperor of Germany [1093–1152], which is understood to be the work of a contemporary sculptor — it is known to have been in existence, at least, as early as 1250, and hence is one of the earliest equestrian portrait statues, after the Roman period, now in existence.

Before the Crusades Jerusalem was the object of many pilgrimages, and it was largely the inconvenience and indignities to which pilgrims were subjected that brought about the crusading movement. Like many another, Conrad when a young man made a pilgrimage to Jerusalem, after it had been wrested from the Saracens in the first crusade, and having thus had personal experience of the reality of the evil, it was most natural that when the time came he, too, should turn crusader, and unite with Louis VII of France in conducting the second crusade, the first in which European monarchs were personally interested. Conrad was defeated by the Sultan Massoud, at Iconium, in 1147, and returned to Germany the following year without having accomplished anything.



William I, Falaise. L. Rochet, Sculptor.

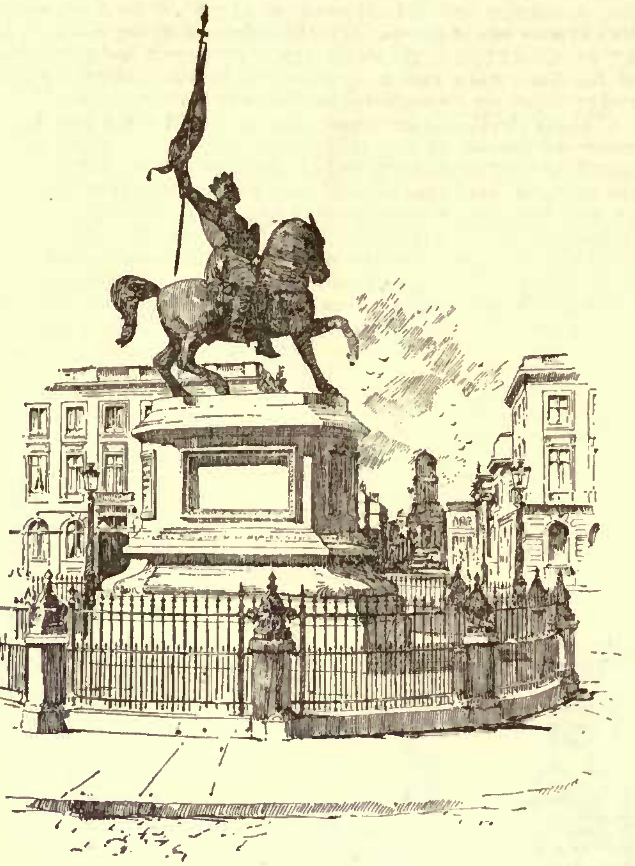
It is curious to note that in the Church of St. Etienne, at Caen, occupying a position very similar to that held by the statue of Conrad, save that it is placed on an external wall, there stands the broken equestrian group which is generally accepted as a statue of William of Normandy, later conqueror of England. It originally was built into the wall beside the gate of St. Etienne, and it was probably while there that it suffered mutilation. Before, however, the sculptor's work was wholly effaced, the group was transferred to the south wall of the great church, and there set in place. The group, which is sometimes called Roman work, is generally supposed to represent some historical incident in which a woman pleads with the mounted warrior either to spare the life of the son or husband who lies beneath the horse's feet, or else calls on him to avenge her loss at the hands of some enemy who has slain him. The incident of a woman, supplicating a horseman, is one not infrequently represented in sculpture. Near the same city, in the Abbey of St. Georges, at Bocherville, is a capital where such a scene is depicted, and on one of the capitals of the Ducal Palace, at Venice, is carved a woman, who has stopped the mounted Emperor Trajan to prefer an entreaty of similar character.

The first crusade had, however, resulted in the redemption of Jerusalem and the crowning in 1099, as King of Jerusalem, of Godefroy de Bouillon, on whom had gradually fallen the leadership of the miscellaneous and disjointed forces which religious enthusiasm had brought together, each petty contingent owning allegiance only to its own leader. It is narrated of Godefroy, as evidence of the deeply religious enthusiasm that influenced the early crusaders, that when he was declared King of Jerusalem he declined the crown, on the ground that he could not wear one of gold, since Jesus was content to wear one of thorns. This hypothetical saying would give one a very exalted idea of the moral stature of the man and the character of the times when such a speech could be received with applause and recorded for transmission to posterity on the pages of history. Unfortunately, these same pages bear the record of the fact that this meek and humble-spirited noble was at least a consenting party to one of the most atrocious scenes of carnage that ever took place. Of the taking of Jerusalem, Dean Milman writes: "Children were seized by their legs, some of them plucked from their mother's breasts, and dashed against the walls or whirled from the battlements. Others were obliged to leap from the walls; some tortured, roasted by slow fires. They ripped up prisoners to see if they had swallowed gold. Of 70,000 Saracens, there were not left enough to bury the dead; poor Christians were hired to perform the office. Every one surprised in the Temple was slaughtered, till the reek from the dead bodies drove away the slayers. The Jews were burned alive in their synagogue. Even the day after, all who had taken refuge on the roofs, notwithstanding Tancred's [Tancred of Hauteville] resistance, were hewn to pieces."

Whatever part Godefroy played in this massacre, there is little doubt that, for the times, he was a devout and pure-minded leader, and if his bigotry did get the better of his humanity, under somewhat exciting circumstances, doubtless he repented of his zeal at a later day when his exaltation had somewhat evaporated, and so he was at least as worthy a subject for honoring, in these later years, with an equestrian monument as many another who has been so honored, both before and since. At all events, in the year 1848 was erected in the Place Royal, at Brussels, on the spot assumed to be the place where in 1097 Godefroy preached his crusade, a colossal bronze equestrian statue of the famous crusader, the work of the sculptor, Simonis.

To English readers the typical crusader will always be Richard Cœur de Lion, and it seems strange that so popular a monarch, and so romantic and chivalrous a character should not have inspired more than one English sculptor to do him honor. Only two equestrian statues of the royal Plantagenet exist, the work, too, of semi-domesticated alien sculptors at that, while there are Hanoverian Georges and Williams unnumbered, set astride for all time. Marochetti's statue of Richard I, because of its position between the east end of Westminster Abbey and the Houses of Parliament, is probably one of the best-known statues in the world, and one more easily remembered than the antiques at Rome because of appealing more closely to the common knowledge of the day, and its good qualities, such as they are, are more often appreciated than those of the Colleoni, at Venice, or the Gattamelata at Padua. If the sculptor had been a man of a little more force, he

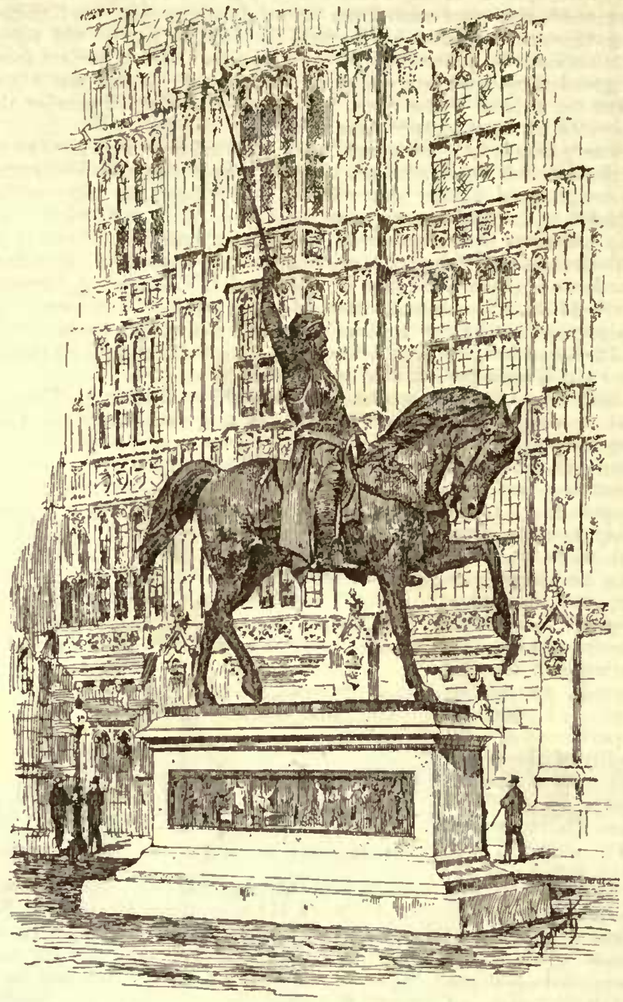
would have left us a grand statue, but as it is, it smacks a little too strongly of the mere Italian prettiness of the degenerate Italian art of to-day, and both horse and rider suggest rather the graces of the *manège* than the rugged frame of a rough-and-ready crusader and his war-horse. It was proper enough to make the steed rather of an Arab type since the heavy horses of the North, even those which



Godefroy de Bouillon, Brussels. E. Simonis, Sculptor.

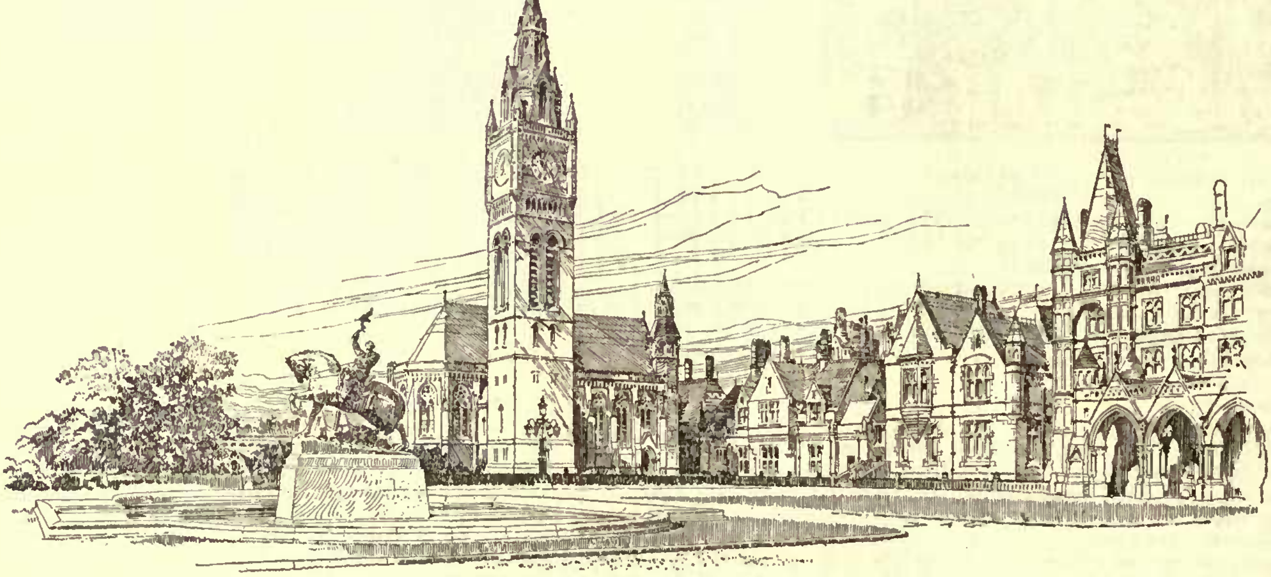
survived the sea-passage, soon succumbed to the torrid temperature of Syria, and Richard probably had in his stud horses in which the desert strain was even more marked than in this. Some critics declare the statue a good one, but seen to disadvantage because of the disproportionately low pedestal, which is only some eight feet high: this is a matter of opinion, and one is rather inclined to count as a merit the fact that, in this case, there is no question as to which is the important part of the composition — the pedestal or its surmounting group. The general air of sleekness, lack of force and character in the modelling and over-elaboration in the detailing of armor and parts of the horse prevent this from being a great sculptural success, but it will always be an historically interesting monument to all, and to many not trained in critical observation will appear all that a statue should.

As associated through a similarity of character and achievement with Richard, it may be proper here to speak of another statue of



Richard Coeur de Lion, London. C. Marochetti, Sculptor.

William the Conqueror, although his only connection with the crusades is that when Duke Robert of Normandy went on a pilgrimage to Jerusalem, he appointed his son William, a child of seven years only, to be his successor in the dukedom. If the Conqueror had been of German strain, there would doubtless be in England many monuments erected to his glory; but though there are hosts of Englishmen whose highest boast is that they are descended from some soldier of William's invading force, there has been no one who thought it worth while to commemorate the Norman leader in bronze or marble. Just as the old equestrian monument of William, already mentioned, is in Normandy, so is this second one to be sought in that quarter, where it will be found in



Eaton Hall, Chester. Alfred Waterhouse, R. A., Architect.

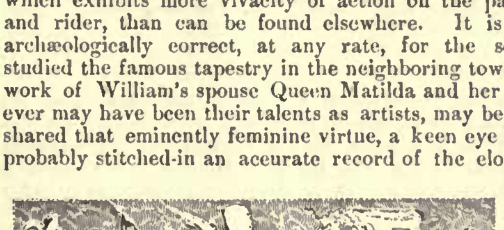
the most natural of places, the birthplace of William, bastard son of Robert the Devil and Arlette, daughter of a furrier of that town.

Not unnaturally William was fond of Falaise, where he was born, and when after the conquest of England, leaving the island to be governed or misgoverned by a viceroy, he returned across the Channel, he spent much of his time there, and he and his successors did much to improve and benefit the town, enlarging it, building about it fortifying walls and beautifying it in many ways. So the town has always regarded him rather in the light of a tutelary saint, and finally felt it incumbent on its inhabitants to erect to his memory



Hugh Lupus, Chester. G. F. Watts, R. A., Sculptor.

a statue. This was done, and on October 23, 1851, was uncovered in the Place de la Trinité the work of the sculptor Rochet, which in some ways is a remarkable piece of sculpture — at least it is the one which exhibits more vivacity of action on the part of both horse and rider, than can be found elsewhere. It is supposed to be archæologically correct, at any rate, for the sculptor carefully studied the famous tapestry in the neighboring town of Bayeux, the work of William's spouse Queen Matilda and her ladies who, whatever may have been their talents as artists, may be assumed to have shared that eminently feminine virtue, a keen eye for dress, and so probably stitched-in an accurate record of the clothes and arms, if not the features, of the men whose actions they were committing to undying fame.



Abbey St. Georges, Bocherville. From Cotman's "*Antiquities of Normandy.*"

The total height of the monument is seven metres, and the statue consumed 6,000 kilogrammes of bronze, and is said to have cost about $12,000. The granite pedestal is commonplace, and made more so by the too-small effigies of six of his predecessors plastered against it.

One of William's favorite followers, a nephew, was Hugh d' Avranches, or Hugh Lupus as he is known in English history, whom he rewarded by making Lord of the Welsh Marches, a territory so large as to be, in effect, a principality, and as such Hugh treated it, setting up an independent court, creating barons and holding his own parliament. The history of the Welsh Marches affords many passages of the most turbulent parts of English annals, and Hugh had plenty of fighting to keep down his increase in weight, which finally earned for him the soubriquet of "the Gross;" but besides being a famous fighting-ground the Welsh Marches were, and in some degree still are, famous for their heron, and so they were at one time the most noted hawking-grounds in England, and Hugh when he had no quarrels on hand devoted himself to this sport with ardor. It is this that led Mr. George F. Watts, R. A., who besides being a painter of the first class has proved himself also a sculptor of no mean ability, to choose to commemorate Hugh Lupus the huntsman rather than Hugh d' Avranches the warrior, in the large equestrian group that was not long ago set up before Eaton Hall, the palace at Chester of the Duke of Westminster, a direct lineal descendant of the subject. The statue which is nearly colossal in size seems so successful that any sculptor might be proud of it, much more a man who has spent most of his life in oil-painting. It seems rather odd that Mr. Watts, who is happily in such easy circumstances that he is able to gratify his whim and keep in his own possession the pictures he paints, should seemingly have so far departed from his rule as to have one of his works set up in this semi-public place, for Eaton Hall is a "show place;" but as the Duke of Westminster is the richest man in England, he was perhaps able to offer inducements that no sane man could resist.

The Crusades. — Holy wars in which the warriors wore a cross, and fought, nominally at least, for the honor of the Cross. Each nation had its special color, which, says Matthew Paris, was *red* for France; *white* for England; *green* for Flanders; for Italy it was blue or *azure;* for Spain, *gules;* for Scotland, a St. Andrew's cross; for the Knights Templars, red on white.

The seven Crusades were:

1. (1096–1100.) Preached by Peter the Hermit. Led by Godefroy de Bouillon, who took Jerusalem.

2. (1147–1149.) At the instigation of St. Bernard. Led by Louis VII and the Emperor Conrad. To secure the union of Europe.

3. (1189–1193.) Led by Richard *Lion-heart.* For knightly distinction. This was against Saladin or Salah-riddin.

4. (1202–1204.) Led by Baldwin of Flanders and the Doge. To glorify the Venetians.

5. (1217.) Led by John of Brienne, titular King of Jerusalem. To suit his own purpose.

6. (1228–1229.) Led by Frederick II. To suit the purposes of the Pope.

7. (1248–1254 and 8 (1268–1270.) To satisfy the religious scruples of Louis IX.

Conrad III. — Of Germany, born in 1093. He was elected emperor in 1138, but his title was disputed by Henry the Proud, Duke of Saxony, and a civil war ensued between the rivals. Conrad was the conqueror, ending the conflict by his victory at Weinsberg in 1140. He conducted a large army of crusaders to the Holy Land in 1147, and besieged Damascus, but failed to take it and returned in 1149. He died in 1152.

Godefroy de Bouillon. — This illustrious leader of the first Crusade was born near Nivelle in France, about 1058. Having gained renown at an early age while fighting for Henry IV, of Germany, he was by him created Duke of Bouillon. The command of the principal army of the crusaders was entrusted to him, and in 1096 he set out for Constantinople. He procured the release of Hugh, Count of Vermandois, a brother of the King of France, who was imprisoned at Constantinople by the Emperor Alexius, and made a treaty with Alexius by which the crusaders agreed to do homage to the emperor on condition of his assistance. The army next advanced to Nice, which was taken after a long siege, and in June, 1098, Antioch surrendered to the crusaders. With the remains of the army, now much reduced by famine and disease, Godefroy marched to Jerusalem, the siege of which was begun in June, 1099, and ended the July following by the capture of the city. He was unanimously chosen King of Jerusalem by the crusaders. He soon aferwards won another victory over the Saracens, at Ascalon. Godefroy gave Jerusalem a set of laws, called the "Assize of Jerusalem," resembling the feudal system of Europe. He did not long survive the taking of the city, as he died in July, 1100. Tasso made him the hero of his "*Jerusalem Delivered*," and the poet does not appear to have exaggerated the merits of a character which presented an unusual combination of wisdom and heroism with the highest Christian virtues.

Simonis. — Eugene Simonis was born at Liège, in 1810, and studied at the Belgian Academy in Bologna, and under Finelli in Rome. He made his debut at the Brussels *Salon*, in 1836, and won a second-class medal at the Paris *Salon* of 1840. He was created an officer of the Order of Leopold and Director of the Academy of Fine Arts, at Brussels, in which city he died in 1882. His works include a number of the sculptures on the column erected at Brussels to commemorate the Congress of June 4, 1831, by which the present Constitution of Belgium was established; the composition entitled "The Harmony of the Passions," which fills the tympanum of the Theatre Royal, at Brussels; the monument to Canon Triest, in Brussels Cathedral; a statue of Leopold I, at Mons; a statue of Pepin d' Héristal; and the following other works: "A warrior defending the standard of his country;" "Charity;" "Innocence" (owned by the State); "A jaguar devouring a rabbit," and numerous sculptures of children and animals.

Richard Cœur de Lion. — Richard I, King of England, surnamed Cœur de Lion, was the son of Henry II and Queen Eleanor. He was born at Oxford, in 1157, and was invested in the duchy of Guienne. He united with his brother Henry in a revolt against his father, in 1173, and on the death of Prince Henry, ten years later, became heir-apparent. In 1188, he made a secret alliance with Philip, King of France, the enemy of Henry II, and openly revolted against his father in 1189. The allies waged war successfully against Henry in France, and induced him to accept their terms of peace. Henry II, however, died in July, 1189, and Richard came to the throne. He showed compunction for his undutiful conduct and chose his father's faithful servants for his ministers. He had agreed a short time before his accession to join the French king in a crusade, and he therefore appointed his mother regent of the kingdom, and departed for Palestine in 1190, the combined French and English armies numbering 100,000 men. Embarking at Marseilles and Genoa, they sailed to Sicily, where the winter was passed, not without serious dissensions arising between the two monarchs, who looked upon each other as rivals. Richard married Berengaria, Princess of Navarre, at Cyprus, in 1191, and in the summer of that year arrived at Acre, which the crusaders had been besieging for two years, and which was still defended by Saladin. Richard and Philip both distinguished themselves by performing many acts of valor at this seige, the former particularly acquiring a splendid reputation for heroism. Acre surrendered in July, 1191, soon after which Philip returned to France, and in September Richard defeated Saladin in a great battle. He then made a truce with him for three years, three months, three weeks and three days, and sailed for home in October, 1192, but was wrecked on the coast of Istria. Attempting to pass through Germany in disguise, he was arrested by Leopold, of Austria, who transferred him to the emperor, Henry VI, an enemy of Richard. By him he was confined in a dungeon, with many insults, and did not regain his freedom until February, 1194, on payment of a heavy ransom. Meantime his brother John had attempted to usurp the royal power, but was successfully resisted. Richard was afterwards involved in several unimportant wars with his rival, Philip of France, but made a truce for five years in 1198. At the siege of the castle of Chalus, near Limoges, in March, 1199, he was mortally wounded by an arrow, and died in the tenth year of his reign and the forty-second of his age.

Marochetti. — Baron Charles Marochetti was born at Turin, in 1805. At an early age his family removed to Paris, where his father practised as an advocate in the Cour de Cassation. After receiving a general education at the Lycée Napoléon, young Marochetti, having shown considerable taste for modelling, entered the studio of Bosio and also studied at L' Ecole des Beaux-Arts. He went to Rome when about seventeen years old and studied there until his twenty-fifth year. At the *Salon* of 1827 he exhibited a group entitled "A Girl playing with a Dog," which gained him a second-class medal. Later he revisited Turin and adorned the city of his birth with an equestrian statue of Emmanuel Philibert, a free gift to the inhabitants. Charles Albert, King of Sardinia, in acknowledgment of his liberality, conferred upon him the title of "Baron," and was ever afterwards a warm friend of the sculptor, who in later years executed an equestrian statue of his benefactor, which is also in Turin. Returning to Paris, Marochetti became a naturalized Frenchman (in 1841), and was well received by Louis Philippe, who gave him many commissions. The Revolution of 1848 drove Marochetti into exile with his royal patron and, like him, he took up his abode in England where he met with much favor from the royal family and the nobility. He first exhibited at the Royal Academy, in 1851, with a bust of the Prince Consort. Ten years later he was elected an Associate and an Academician in 1866. He was made a Chevalier of the Legion of Honor in 1839, and Grand Officer of St. Maurice and Lazarus in 1861. He died at Passy, near Paris, in 1867. Marochetti produced a number of equestrian monuments, among which are one of Wellington, at Glasgow; one each of Queen Victoria and Prince Albert, in the same city; one of the Duke of Orleans; and one of Field

Marshal Combermere, at Chester; and he also executed a design for an equestrian figure of Washington, the cast of which was exhibited at the Crystal Palace, in New York, and destroyed when that edifice was burned in 1858. His other works include statues of Lord Clyde, in Waterloo Place, London; Lord Clive, in Shrewsbury; La Tour d' Auvergne, in Carhaix; monuments to Bellini, in Père-Lachaise; to Lords William and Frederick Melbourne, in St. Paul's; to the British soldiers dead in the Crimea, at Scutari; and the mausoleum of the Princess Elizabeth, daughter of Charles I, in the Church of St. Thomas, Newport, Isle of Wight. In addition, may be mentioned his "Apotheosis of Mary Magdalene," on the high altar of the Madeleine, at Paris; the bas-relief of the battle of Jemappes on the Arc de Triomphe; "The Fallen Angel"; "Sappho," and many busts.

William the Conqueror. — William I, surnamed the Conqueror, born at Falaise, in Normandy, in 1025, was an illegitimate son of Robert, Duke of Normandy. He succeeded his father in 1035, as William II of Normandy, and during his minority gave proof of his energy and courage by reducing to submission the rebellious Norman barons. He gained the favor of his kinsman, Edward the Confessor, King of England, who, having no issue, formed a secret intention to adopt William as his heir. His chief competitor was Harold, a Saxon prince, whom a majority of English people preferred to William. On the death of Edward, in January, 1066, Harold ascended the throne, without opposition, and William resolved to invade England. Assembling a fleet of 3,000 vessels and an army of 60,000 men, he set sail and landed at Pevensey in Sussex, about the 28th of September, and defeated the English, commanded by Harold, at Senlac, near Hastings, on October 14th. Harold was killed in this battle and William is said to have lost nearly 15,000 men. The latter was crowned in Westminster Abbey on the 25th of December, Edgar Atheling, who had been proclaimed King on the death of Harold, renouncing his claim and submitting to William. He ruled England with much severity and maintained his power by acts of great cruelty. He refused to render homage for his kingdom to Pope Gregory VII, but paid him the usual tribute of Peter's pence. About 1078, his son Robert levied war against him in Normandy, but happening to encounter the King and wounding and unhorsing him, was struck with remorse on discovering what he had done, asked his father's pardon and made peace with him. In the latter part of his reign he ordered a general survey of his kingdom, the results of which are contained in the famous "Domesday Book." He married Matilda, a daughter of Baldwin, Earl of Flanders. He died at Rouen, in 1087.

Rochet. — Louis Rochet was born at Paris, in 1813. He was a pupil of David d' Angers, and won medals in 1841 and 1855, respectively. He died in Paris, in 1880. His principal works were an equestrian statue of the Emperor Dom Pedro I, in Rio Janeiro; an equestrian monument to Charlemagne, erected in front of Nôtre Dame, in Paris; statues of Napoleon as a scholar, at Brienne, erected in that city; of General Daumesnil, at Vincennes; and of the Comte d' Erlon, at Rheims. His ideal sculptures include a group of "Ugolino and his sons;" "Minerva"; "Cassandra"; and "Mercury and Bacchus."

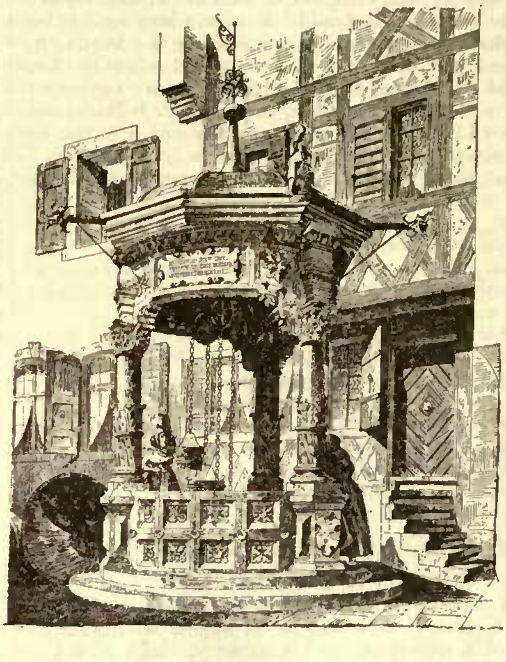
Hugh Lupus. — Hugh d' Avranches, called Lupus (also "Hugh the Gross," from his corpulency) was the son of Richard, Earl of Avranches, in Normandy, and either came to England with the Conqueror or shortly after followed him. Hugh was a nephew of William, who created him the first Earl of Chester and Lord of the Welsh Marches, in 1070. Lupus established his own parliament; created eight barons, whom he gave great possessions and many privileges; instituted three *asyla* or refuges for the fugitives of all nations, in order to recruit the population of the Palatinate; and bestowed large endowments upon the Abbey Church of St. Werburgh (now Chester Cathedral) within whose walls he died and was buried in 1101. He was one of the Conqueror's chief men, and was a brave and able soldier, an active and prudent ruler and an indefatigable huntsman. Although in the latter part of his life he became luxurious and prodigal, he was a generous patron of honourable men, clerks as well as knights.

Watts. — George Frederick Watts, R. A., was born in London, in 1818. As an artist, he is self-taught. His first picture was exhibited at the Royal Academy in 1837, and in 1843 he gained a prize of £300 for his cartoon of "Caractacus," and one of £500 from the Commissioners for the Decoration of the Houses of Parliament, for his "Alfred inciting the Saxons to prevent the landing of the Danes." His fresco of "St. George and the Dragon" is at Westminster Palace, and his large mural painting entitled "Justice: a Hemicycle of Law-givers," is in the new hall of Lincoln's Inn. Among his ideal paintings may be mentioned "Love and Life," and "Love and Death"; "Orpheus and Eurydice"; "Paolo and Francesca"; "Time, Death and Judgment"; "Hope"; and "The Court of Death." His portraits include Cardinal Manning, Tennyson, Millais, Sir Frederick Leighton, Gladstone, John Stuart Mill, Dean Stanley, the Duke of Argyle, Browning and Joachim. In 1884 he lent a representative collection of his paintings to the Metropolitan Museum of Art in New York, where they were on exhibition for a number of months. His works in sculpture are "Venus"; "Clytie," (a bust); monuments to the Marquis of Lothian at Blickling Hall, Norfolk; to Mr. Cholmondeley Owen, at Condover Hall, near Shrewsbury; and to the Bishop of Lichfield, in Lichfield Cathedral; and a colossal equestrian group, upon which he is now engaged, called "Vital Energy." Mr. Watts has received the titles of D. C. L. and LL. D. He declined a baronetcy in 1885.

[To be continued.]

What is a Fire? — A curious point of law, bearing upon the responsibility of insurance companies, has just been decided in the Paris Law Courts (5th Chamber of the Civil Tribunal of the Seine), at the suit of the Countess Fitz-James *vs.* the Union Fire Insurance Company, of Paris, by which it is ruled that insurance companies must indemnify all losses sustained by an assured caused by fire, even in the cases where no destruction of premises has been caused by conflagration. The Countess Fitz-James insured against fire, in the above company, all her furniture and effects for 558,000 francs, and in her policy, under Art. 7, were mentioned her jewels, among which figured specially a pair of earrings, composed of fine pearls, valued at 18,000 francs. On April 17, 1887, one of these earrings, which had been placed on the mantelpiece, was accidently knocked down by the countess and fell into the fire, where it was consumed, notwithstanding every effort made to save the jewel. Expert jewelers were called in by both parties to estimate the intrinsic value of the property destroyed, and 9,000 francs was stated to be the amount, less 60 francs for molten gold rescued from the ashes. The insurance company refused to pay for the burnt pearl on the ground that there was no conflagration, that the fire which consumed the object was an ordinary fire; in other words, that there was no fire, and that the company was not responsible where combustion had only occurred by the ordinary use of a grate for heating purposes. The court, however, rejected this, and ruled that "the word *fire*, in matters of assurance, applied to every accident, however unimportant such accident may be, so long as it is caused by the action of fire." It was, therefore, ordered that the Union Company should pay to the Countess Fitz-James the value of the jewel, less that of the gold recovered, viz., 8,940 francs and costs. — *Irish Law Times.*

JEAN PAUL AUBÉ.[1] — II.



In 1880, when the Government opened a competition for a great monument at Versailles, to commemorate the Constitutional Assembly of 1789, Aubé, in company with his old friend and school comrade, Dalou, and two architects, made a sketch ten feet high.

There were a large number of competitors, and, though no choice was made, the result of the labors of this art partnership brought to the sculptors three thousand dollars in money, and to each an important commission. Amongst the sculpture on the sketch was a bas-relief by Dalou, representing the famous scene in the Assembly between Mirabeau and the Duke de Dreux Brézé, in which Mirabeau declared, in a voice of thunder, "We are here by the will of the people, and we propose to stay unless driven away by the point of the bayonet." And also a sketch, by Aubé, of Bailly giving the oath in the Jeu de Paume, June 20, 1789.

When Gambetta visited the exhibition of the models he was so strikingly impressed with the style and audacity of the bas-relief, though it was of small size, and the earnest elegance and simplicity of the Bailly, that he said to those who were with him, "The sculptor should be commissioned at once to execute those sketches in large dimensions." M. Turquet, Rodin's good friend, was at that time Under-secretary of State, and he heartily joined in the wish expressed by Gambetta. With two such men as interested friends, the sculptors did not wait long before receiving commissions from the Government to execute their sketches. To Dalou, especially, this event was of the utmost importance. He had been a political exile in London since 1871, and had just returned to Paris without either work or money. He was really in deep misery, though he was well known in Paris as a sculptor of remarkable ability, and in London he had made many works of superior merit. The commission for the great bas-relief, for there are in it over fifty figures larger than life, set him on his feet, or, as Aubé says, "It hatched him."

To Aubé, the order for the "Bailly" was also important. It was a subject of historic and dramatic interest, one requiring for its full expression a high and peculiar style of genius, rare even in French art.

The bronze statue of Dante and a group, in plaster, of "War," were exposed in the *Salon* of 1880. The reappearance of the "Dante" in a material calculated to emphasize its character was the signal for a universal commendation by artists and critics, summed up in a single sentence: "The 'Dante' reveals an artist who is preoccupied with the beautiful in the grand." The full merits of the statue were not signalized until several years later, and after the sculptor had executed three or four more statues of historic character. The group of "War" was generally condemned because of the too savage interpretation of the subject. The sculptor represented the goddess as a terrible fury, who, sword in hand, was rushing over the earth like a cyclone, trampling under her feet the unprotected infant, and leaving death and desolation wherever she went. Though this interpretation was true and the composition excellent, it was too much even for the warlike descendants of the ravaging Gaul.

For the *Salon* of 1881, Aubé sent his "Agriculture," in marble, and a bust of Count Simeon, also in marble, and belonging to the Council of State. The year following he exposed a fine statue, in plaster, of Michel Lallier, an ancient Paris mayor, which is placed on the Hôtel de Ville. In 1883 his plaster figure of Bailly appeared, accompanied by an exquisite nude female statue, called "The Coral." Both were well appreciated, especially by the artists, but it was not until the following year, when the "Bailly" was exposed in bronze, that the writers became aware that it was a superior work of art, "one of the finest historical figures in France."

With it Aubé exposed a plaster statue of Shakespeare, larger than life, representing the bard as reciting his own plays. While the "Bailly" was cordially received as a beautiful figure, full of

[1] Continued from No. 712, page 77.

simple and grand dignity, very natural and living, "coming from a sculptor who manifests more and more a strong and refined originality," the "Shakespeare" was criticised as well as praised. Every Frenchman knows all about Bailly, and the statue was recognized as thoroughly representing the personage whose name it bore, and its author, as one of the few sculptors who are leaving far behind them classic or academical traditions, and approaching more intimately than ever to the free and living teachings of nature. "The statue is one of the very best historic works in France, the author belonging to the first order of sculptors."

The sculpturesque character of the "Shakespeare" raised no question. "It was well modelled, thoroughly understood as a construction, elegant in its style and movement; but was it a good representation of the personage?" said a few critics. Its most serious eulogists simply affirmed that its justice and vivacity of movement was not only remarkable, but that it revealed an intimacy of conception every way worthy of the subject.

It is surprising that these statues brought the sculptor no *Salon* medal. The "Bailly" went to its destination, the Chamber of Deputies, and the "Shakespeare" to the artist's studio, where it still remains. If Aubé failed to win the accustomed *Salon* recognitions, he was quietly and surely attaching to himself a more certain fame among powerful public art lovers and men of political influence. His few artist friends were sure of his future, and for himself he had no anxiety. His work shown at the *Salon* produced the desired result: he could live without medals.

THE COMPETITION FOR THE GAMBETTA MONUMENT.

Three months after the death of Gambetta, March 28, 1883, the friends of this statesman whom France had lost when she needed him the most, addressed to their fellow-citizens an appeal having for its object the erection of a monument to his memory, which closed as follows: "It is necessary to glorify, in a symbol that the genius of our artists will make as magnificent as the subject, the double enterprise to which Gambetta, as great a Republican as he was a Frenchman, has consecrated his life — national defence and the foundation of the Republic. To serve as a lesson and an example to generations to come, this monument should be erected on one of the public places of Paris." The entire country was called upon for subscriptions, and from every corner of it there was an immediate and hearty response, the subscribers numbering more than two hundred and fifty thousand. More than eighty thousand dollars were received before a year had elapsed, and a competition was immediately opened to all French artists. Eighty-four projects were presented by the first of June, 1884, for the consideration of the committee and the examination of the public. The committee was composed of prominent public men, legislators and artists, the latter being Chapu, Dubois, and Guillaume, sculptors, and Garnier, architect. The president was Antonin Proust, one of the most ardent and energetic of French art lovers. Each project bore the name of its author or authors, for most of them were made in colaboration between a sculptor and an architect. Aubé contributed two, one in conjunction with Dutert, the other with Boilean. In the large majority of press notices of this immense expression of concurrent art effort, the project of Aubé and Boileau was ranked among the best three, but before any decision in regard to the relative merits of the projects had been reached Aubé's had gained in general favor, because of the subjects he had included in his design and their relation to each other. The composition was declared to be of the first order. The projects were divided between two principal types: those that were surmounted by an allegorical figure of France or the Republic, in a sense protecting the statue of the orator, which was placed in high relief below, and on the face of the monument, and those that placed Gambetta on the summit of the structure. The principal objection to the last was the evident difficulty of giving sufficient dimension to this statue, so that it might appear as the dominating element of the composition, and still preserve a well-proportioned whole. The Aubé and Boileau project belonged to the first category.

The first duty of the committee was to select six of the eighty-four projects, and request their authors to make a second and final essay, these projects to be one-tenth the size of the full dimension. The following were chosen in the order of merit, as selected by the committee:

1. Falguière, sculptor; Pujol, architect.
2. Coutan, sculptor; Lambert, architect.
3. Aubé, sculptor; Boileau, architect.
4. Injalbert, sculptor; Laloux, architect.
5. Dalou, sculptor; Faure Dujarrier, architect.
6. Aubé, sculptor; Dutert, architect.

The final decision was made in November, 1884, after a deliberation by the committee of three hours, during which several votes had been taken. There were fifteen committee-men, and the Aubé-Boileau project was chosen by nine votes. Four votes were given to Falguière and two to Dalou. Twelve hundred dollars were awarded as a prize, to Dalou, by nine votes; eight hundred to Falguière, by fourteen votes, and six hundred each to the other three competitors.

The monument was described in the papers as follows: "A pedestal in the form of an obelisk resting upon a base. On each side of the base a large allegorical figure in bronze, one representing Truth with her looking-glass, the other, Force. In front, and attached to the pedestal, a very animated group slightly recalling that of Rude, on the Arch of Triumph. In the centre of this group stands Gambetta, while over and above him a genius unfurls a flag, and soldiers spring up around him as if animated by his voice, one of them picking up a sword which lies at the statesman's feet. On the summit of the monument is placed a winged lion, who carries upon his back the nude figure of a woman, representing the young Republic. In her hand she holds a tablet upon which is written the declaration of the rights of man. The lion seems to have made a great effort to get to the place he occupies, and to remain there firmly and safely. His action shows grand energy and style." The idea embodied in the monument, as described by the sculptor, is this: "We did not wish to make a statue or a monument to Gambetta, but a kind of commemoration of the work in which he was the most valiant assistant. Nor did we wish to have it recall the structures erected to the glory of princes and Cæsars. I don't know that I can clearly give my thought in words. We wished to make a monument to Democracy. For instance, as Napoleon surmounts the column of Vendome, so we desired that, in a Republic, Democracy should dominate and complete our shaft.

"In nearly all the models (some of which were very remarkable) it was the figure of Gambetta which dominated. The jury chose ours, without doubt, because they found our conception in closer *rapport* with the sentiment that was indulged in by those who gave their money for the erection of the monument."

Of the hundreds of newspaper notices of the designs for the monument, the large majority commended the choice of the jury. A few writers, while warmly acknowledging tho merits of the chosen design, regretted that the competition did not bring out work worthy of such masters as Rude, Barye and Fremiet. It was not, they said, such a competition as was to be expected from French sculptors. "It represents a good condition of decadence." "The sculpture is more graceful than grand, more elegant than monumental." The longest and severest criticism appeared in the *Figaro*, from the pen of Albert Wolf. Here are some extracts: "Monumental sculpture is particularly different, because it has to contend with space; its principal function is to impress by its clearly-cut forms, composed of simple and powerful lines; the first view should produce this impression and print it permanently upon the mind. The great defect of all these sketches is, that they lack unity of con ception. Not one of them can be seen clearly at first sight. All suffer from an accumulation of incidents in the life of Gambetta, or by allegorical representations of his virtues which trouble the observer and call his attention from top to bottom, from one side to the other.

"These six sketches of various apotheoses are all defective from a conceptive point-of-view; they are all evidences of the regretable tendency of modern sculpture which is nothing but literary sculpture. Our sculptors are not contented in making the statue of Gambetta, they wish to recount his whole life; behind him, at his feet, at the four corners, on top, they repeat anecdotes about him, until he is completely lost in a crowd of accessories. Monumental sculpture, destined for public places, ought to be, above all, simple; appealing to the mind by grandeur of line, and clearly presenting the principal statue alone in space. At no epoch have great sculptors proceeded otherwise; always, through all the centuries, their art has been based upon the same principle of simplicity. From this point-of-view there are no more works of art worthy of the name; and consequently the projects for this monument have not the qualities to satisfy thoso who know; they are all so complicated by invention that the eye goes here and there without finding complete satisfaction." "The trouble is that we don't know how to do things with moderation and tact; we pour out exaggeration from every side with equal vigor. We are overdoing the thing, our zeal runs away with us."

"Let us take an example from Italy, in the monument which she has erected to Cavour, at Milan. It is impossible to produce a greater effect with such simple means. Nothing shocks you; his whole life is contained in a figure of History, who, pen in hand, writes the name of this great statesman on her tablet. The artist who made this monument has not stuffed us with insignificant and useless details, like political wisdom, military force or other allegorical representations. Up to this time bas-reliefs discreetly placed on the pedestal have sufficed to give the details of the life of a man, but never have they invaded and covered up the principal figure. Go and look at these six sketches, and tell me if they are not more like the apotheoses of fairies mounting through the clouds rather than serious works of monumental art." "None of these projects are worthy of the subject, but the jury are right in choosing that by Aubé and Boileau, because it is the most interesting. The public will ratify the jury's judgment. There was no other way but for them to crown the sketch by Aubé." The other sketches were mercilessly ridiculed by the *Figaro* critic, especially emphasizing the fact that their authors were, with one exception, Grand Prix de Rome, and were now fairly beaten by a man who had never received the honors of the School, and had received but few of its benefits. The whole scheme of the monument was severely condemned by those who did not admire Gambetta, because of its size and pretension. It embraced too much; not only was the stateman's memory consecrated but the Revolution glorified, in the programme marked out by the friends of the chief figure in the National Defense. "Neither Charlemagne, Henry IV, Louis XIV, nor Napoleon, has any memorial to compare with this to Gambetta. What will the world think of

Thiers, with the simple statues erected to his memory, when it sees this ambitious structure?"

Another item of importance to the sculptor was that the sum collected to pay for the monument was barely sufficient for the purpose, and necessitated the greatest economy in the execution.

Many of the art-writers spoke of Aubé as a sculptor little known to the general public, though the author of several statues of exceptional merit. Some of the more serious ones publicly congratulated him upon his long-deserved good fortune, and embraced the opportunity to reproach the powers of art in France that a man of such fine talents should be obliged to wait and work until he was forty-five years of age before he was charged with an important public commission.

Allusion was also made to the injustice Aubé had suffered in other competitions, where his sketches had been the best, but were overruled by other than art considerations. Very pointed references were made to the shameful conduct of certain artists, and to the questionable manner in which competitions were too often conducted. "The decision of this competition is just — a rare event."

He was generally spoken of as "the author of *Dante*." A few writers attempted to say something about his life in the space of fifty words. One of them, representing *Le Matin*, ventured to visit his humble abode in a distant quarter of the city for the purpose of interviewing him. He received "the idea of the monument," as quoted, and added, "Aubé, unknown yesterday, to-day celebrated, modest, simple, frank, cordial; it needs an hour of conversation with him to know his good qualities." T. H. Bartlett.

(To be continued.)

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A PARTY-WALL QUESTION.

York, Pa., September 2, 1889.

To the Editors of the American Architect: —

Dear Sirs, — I have just read in your last issue your opinion on my communication, "*A Party Wall Question*." Now for the sequel. A approached me a few days ago and said that he would not forget that himself and B were neighbors and should dwell together in peace and harmony, therefore, we might use the party-wall without opposition or charge from him. Very truly, Equity.

NOTES & CLIPPINGS

Casting Plate-Glass. — The casting-tables, the most important pieces of apparatus in a plate-glass works, are nineteen feet long, fourteen feet wide and seven inches thick. Each is provided with an iron roller, thirty inches in diameter and fifteen feet long. Strips of iron on each side of the table afford a bearing for the rollers, and determine the thickness of the plate of glass to be cast. The rough plate is commonly nine-sixteenths of an inch in thickness; after polishing it is reduced to six or seven sixteenths. The casting-tables are mounted on wheels, and run on a track that reaches every furnace and annealing-oven in the building. The table having been wheeled as near as possible to the melting-furnace, the pot of molten glass is lifted by means of a crane, and its contents quickly poured on the table. The heavy iron roller is then passed from end to end, spreading the glass into a layer of uniform thickness. The whole operation of casting scarcely occupies more time than it takes to describe it. Each movement is made with almost nervous rapidity. Few industries offer such fine scenic display as the pouring of molten glass. One feels like crying Encore! it is so very brilliant. In contact with the cold metal of the table the glass cools rapidly. As soon as possible the door of the annealing-oven is opened, and the plate of glass introduced. The floor of the oven is on the same level as the casting-table, so that the transfer can be conveniently and quickly made. When, after several days, the glass is taken out of the oven, its surface is found to be decidedly rough and uneven. A small quantity is used in this condition for skylights and other purposes where strength is required without transparency. It is known in the market as rough plate. The greater part of the glass, however, is ground, smoothed and polished before it leaves the establishment. — *British Mercantile Gazette.*

John Gregory Crace. — Mr. Crace, who died recently, at his residence, Springfield, Dulwich, was for many years an active member of the Society of Arts. On January 27, 1858, he read a paper on "The Use of the Soulages Collection of Italian Art in Modern Art Manufacture," when numerous specimens from the collection were exhibited. Four years later he read a paper on "The Decoration of the International Exhibition Building," a work upon which he was then engaged. In 1866 he read a paper on "Old London: its streets and thoroughfares," the information in which was grounded on the fine collection of London views originally formed by Mr. Crace's father, and now in the British Museum. Mr. Crace was born in 1809, the fourth in descent of a race of artistic decorators. His father, Frederick Crace, was the son of John Crace, who was born in 1754. John Crace's father (Edward) decorated the Pantheon in Oxford Street, in 1771, and in 1780 was appointed by the Crown Curator of the pictures in the Royal Palaces. Mr. J. G. Crace was selected by Government, in 1848, to execute the colored decoration of the new Houses of Parliament. He was largely employed at the Exhibition of 1851, and designed the decorations for the Art Treasures Exhibition at Manchester, in 1857. In 1861, he was employed in the decoration of the Waterloo Chamber at Windsor Castle. In the following year he was engaged on the Exhibition of 1862, already referred to. He decorated the Society's meeting-room, when it was last repaired, in 1882, as he had done on previous occasions. — *Journal of the Society of Arts.*

TRADE SURVEYS

There is less room now for fault-finding with trade and business than, perhaps, for the past five years. The present outlook is most satisfactory, because of the multitude of new opportunities that are being offered to capital and enterprise. Southern industrial statistics show that, during the first half of the year, some 2,500 enterprises were started, as against 2,000 for the same time last year. These statistics show, also, that the investments of capital are larger. The South, as a field for enterprise, is gaining in favor among moneyed men. Land is appreciating in value slowly; nothing like a speculative movement is apparent. Railroad building is being pushed in all of the Gulf States and in the States west of the Mississippi. Huntington and his associates are credited with brilliant railroad construction schemes. If all of the rumors concerning projected railroad construction, ship-building, and like enterprises now heard on the street are to be credited, the South is on the eve of such a boom as it has never dreamed of. The favorable crop reports in the Southwest, including Texas, have stimulated agricultural, mining and manufacturing enterprise in those States. This healthy condition of affairs is assisting the activity of business in the Gulf States. Two or three new lines of railroad are projected there. Of course they will be mainly made up of the completion of existing lines, but some of the enterprises talked of involve the building of from two to three thousand miles of new line, mainly west of the Mississippi. If this is carried out, it will be followed by large land-purchasing operations by one or more syndicates of foreign capitalists, who are now in the South with a view to placing money where, in a few years, it will yield good returns. These capitalists and the railroad-builders who are going before them see in Mexico still grander possibilities for profitable investments. The mines of that country are yielding richer returns than ever, and new railroad construction will probably develop territory more valuable than any which has yet been worked. Of course, many of the schemes of this nature are merely paper schemes; but the capitalists on both sides of the Atlantic are aroused, and the crusade — for it is nothing more nor less — has started in to secure the cheap and almost valueless lands of these remote regions, with a view of holding them for future developments. There is an abundance of idle money in this country and in Europe, and in foreign countries there is a well-grounded feeling of distrust in the continuation of the rule of the now ruling powers. Wars may arise, which will not only jeopardize the control of existing governments, but also jeopardize the indebtedness which weighs down the masses in European countries. These may seem far-drawn inferences and conclusions, but the fact remains, nevertheless, that such considerations as these are moving capitalists who control scores of millions to transfer some of their money and management to the New World. These things are talked about much more abroad than they are here. Here we are busy with the details of making money, extending manufactures and trade.

So far as fall business has developed, there is no fault to be found with it. Jobbers are busy. Manufacturers also, in a general way, are busy. Iron and steel makers have more work on hand than they have had at any one time for years. The makers of structural and plate-iron are oversold from two to four months. There has not been such a rush of orders for years; but the effect so far has been only to strengthen prices, the producing-capacity being so enormous. The merchant-bar mills and merchant-steel mills are crowded with orders, and a general advance will probably take place if pig-iron should move up, as is probable. One large Southern company, and also one large Northern one, have already taken this step. There is some hesitancy among manufacturers generally as to advancing prices; it frequently checks business and retards enterprise. Outside of iron and steel there is similar activity. The coal-producers of the anthracite regions are a little behind the output of last year, and the management are unable to advance prices. So many new sources of supply have been opened during the past year that it is difficult to say whether this year's production of soft coal is larger than last; but the presumption is, that it is somewhat greater. During the past summer three or four hundred new lumber-yards, two or three hundred new foundries and a multitude of smaller concerns, involving the use of capital from $5,000 to $20,000, have been established in the States west of the Mississippi, and those who sell pig-iron, lumber, petroleum, machinery, motive-power, tools and implements, know to what an extent these little industries are contributing to the general prosperity that exists. Fortunately, there is an abundance of money, through the friendly action of the Government. The only real danger at this time is that the encouraging conditions may induce thousands of men to embark in trade and manufacturing, who should remain where they are. The business world now has its eye upon the railroad situation, and should that prove satisfactory, there will be a rush in railroad construction next year. But even should railroad-building not be prosecuted on a large scale, this much is assured: the demand for equipments is sure to be phenomenally heavy. Very few roads have maintained their equipment and motive-power in first-class condition, and nearly all the large companies ought to be in the market for supplies.

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DESIGN FOR MONUMENT TO THE CONSTITUENT ASSEMBLY

J. P. AUBE · SCULPTOR

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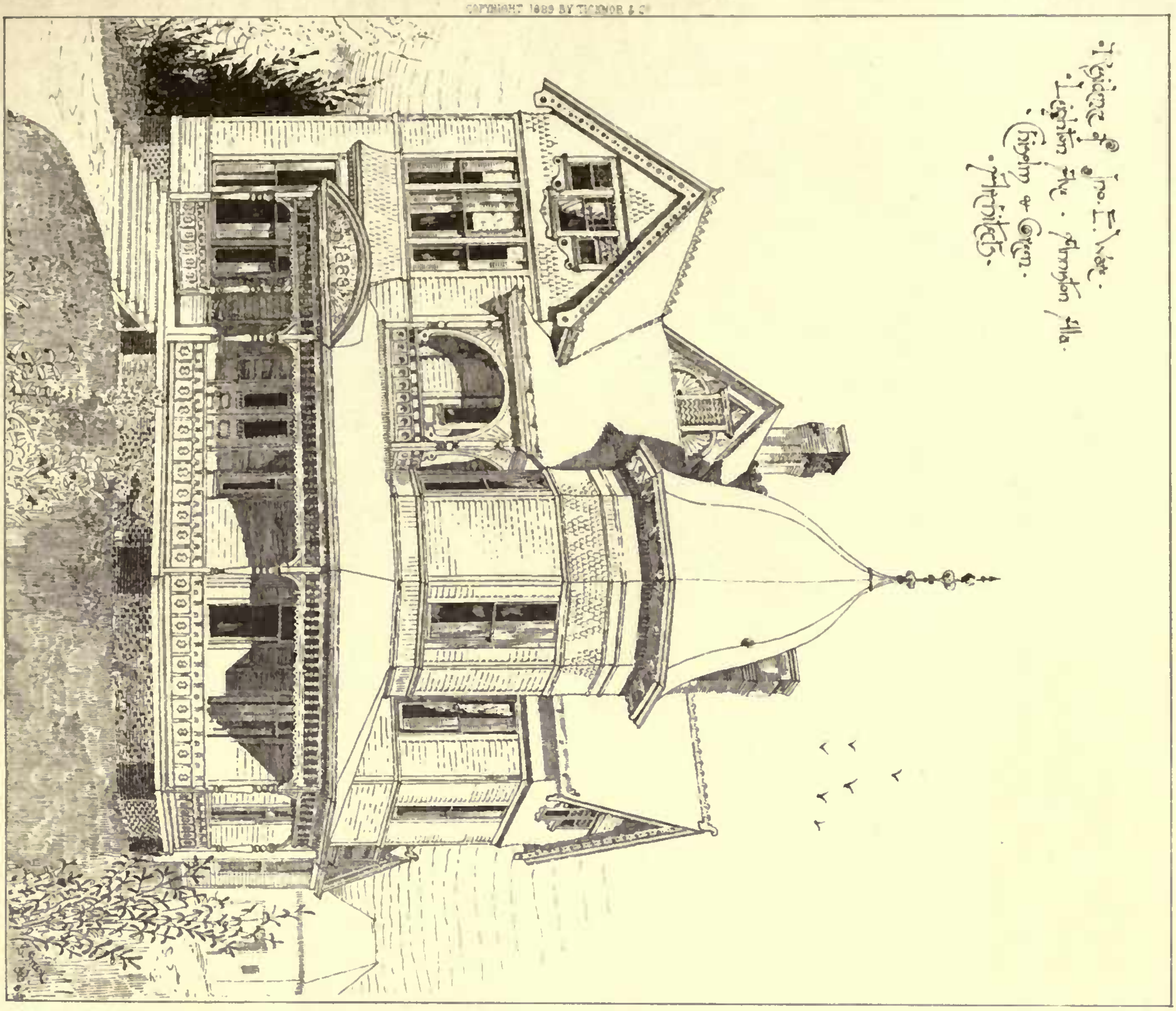
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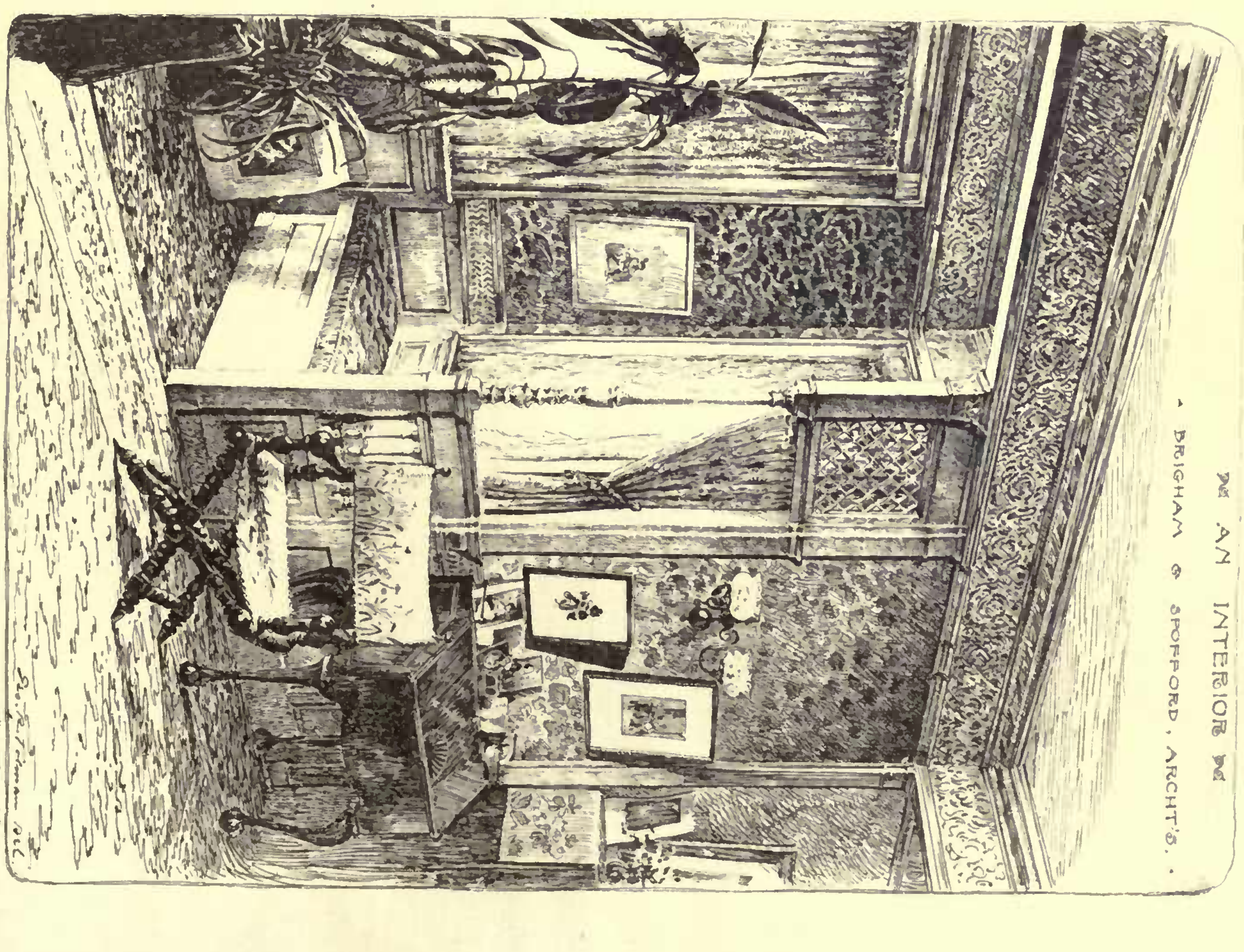


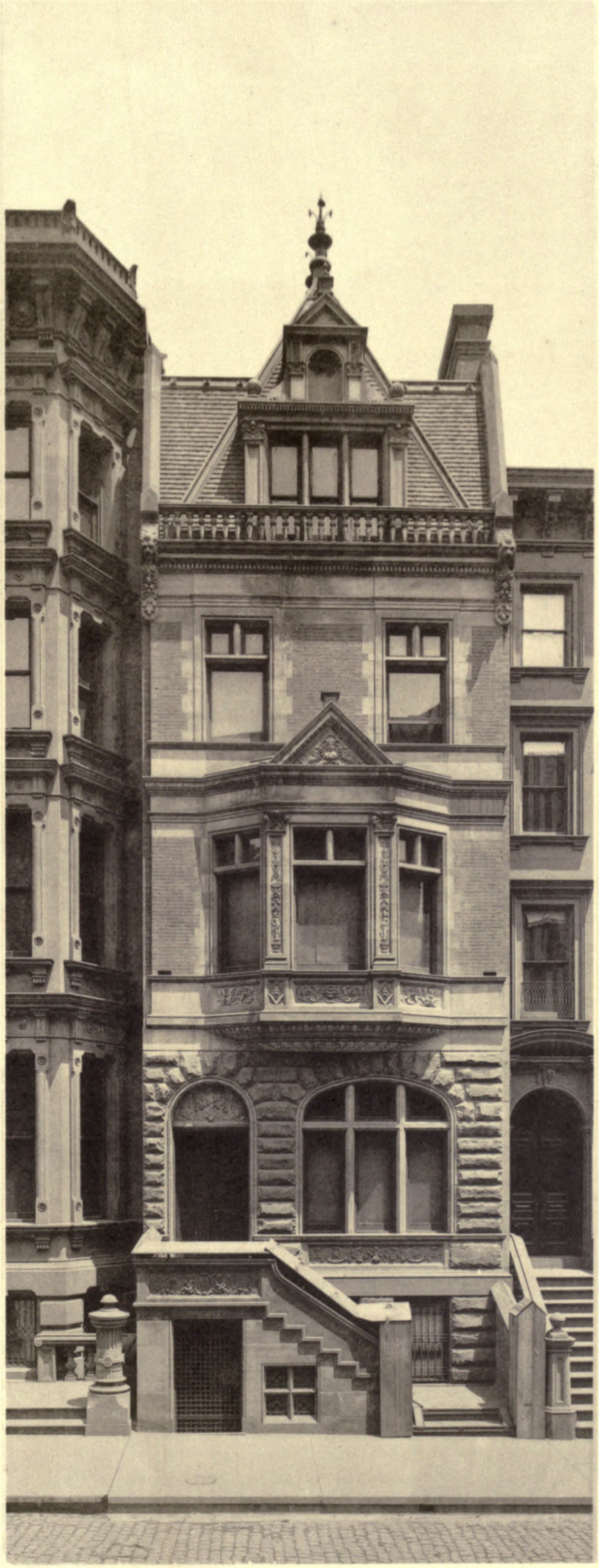
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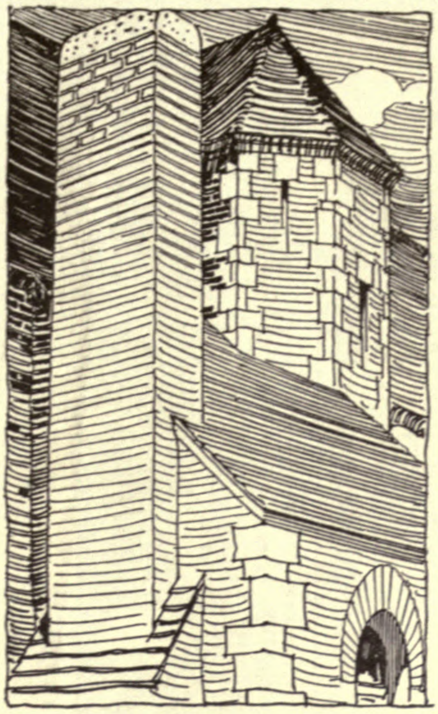

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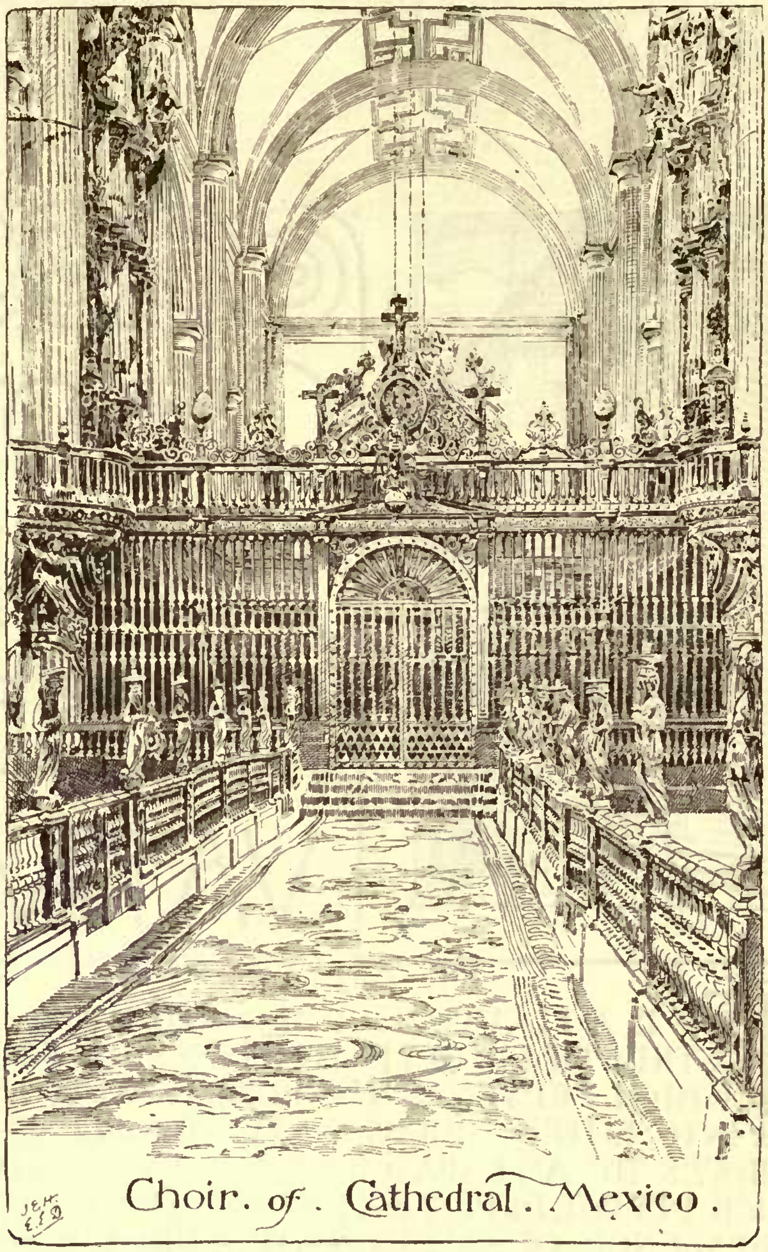
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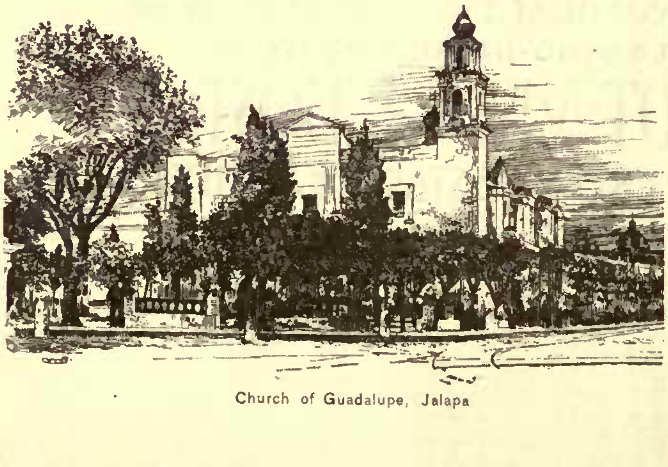
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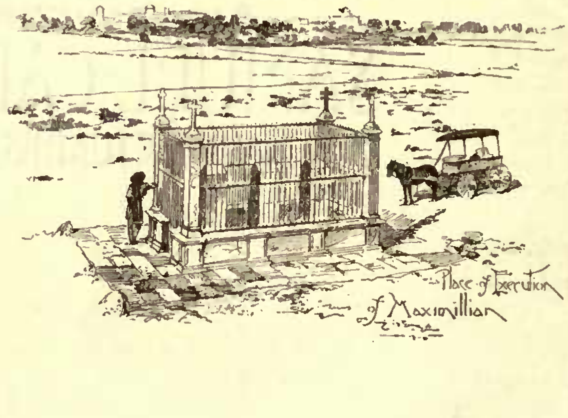
ALSO MANUFACTURERS OF CREOSOTE STAINS & ANTIPYRE ·



Choir. of. Cathedral. Mexico.



Church of Guadalupe, Jalapa



Place of Execution of Maximillian

MEXICAN SKETCHES.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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WE take much pleasure in calling attention to the opening of classes in architecture, in connection with the Art Institute of Chicago, on Van Buren Street, near Michigan Avenue. The school year is from September 27 to June 7, with an intermission of a week at the holidays, and the work of the classes extends through the day and evening, so that an earnest student has an opportunity to learn a great deal in the two years which is considered by the instructors the shortest period in which any considerable part of the course can be accomplished. The regular instruction is at present under the charge of Mr. Louis J. Millet and Mr. William A. Otis, and lectures are to be given by Professor W. L. B. Jenney, Mr. John W. Root, Mr. D. H. Burnham, Mr. I. K. Pond, Mr. J. M. Ewen, and perhaps others. The names of these brilliant and accomplished architects among the lecturers is alone enough to show that the new school aims at the best professional teaching that can be given, and understands what must be done to form a course of thorough and solid training in the art, and the details of the scheme only need to be worked out as circumstances may indicate. It is a great advantage for the school that, being a department of the Art Institute, its students enjoy the almost inestimable privilege of drawing, painting and modelling to any extent that their leisure or ambition may dictate, with the classes in the other departments; and it is no less an advantage that so many of the ablest men in the profession in the city should have been enlisted, at the outset, in the task of guiding the development of the plan of instruction. To a school of architecture commencing its existence under such auspices all things are possible, and the men who have made Chicago artistically one of the most interesting places in the country could do nothing more honorable to themselves than to promote in every possible way the true interest of the school where the talents of their successors are to be developed. Students who propose to enter the school should apply to Mr. N. H. Carpenter, Secretary, at the Art Institute, Van Buren Street, for such further information as they need, and are particularly requested to send in their names, if possible, a week before the beginning of the term.

M. RIVOALEN, in the *Encyclopédie d'Architecture*, makes some valuable observations on the use of concrete in connection with iron in floors. He mentions that, a few years ago, M. Dupuis built a Catholic book-store in the Rue des Saints Pères, in Paris, the floors of which, twenty-six feet in span, were covered with segmental vaults of concrete containing a skeleton of iron I-beams. As architects know, the loads on the floor of a book-store are often very great, and, as they are frequently moved, the strain which they impose on the construction may be serious; but these concrete floors, although not heavy, have shown themselves very strong and stiff, far more so, in fact, than a floor would have been if laid with a similar number and size of I-beams, filled in with brick or terra-cotta arch-blocks. It is about fifteen years since Mr. Thaddeus Hyatt called attention to the property possessed by Portland-cement concrete, of attaching itself so strongly to iron that a beam might be composed of the concrete, having iron bars laid in the lower portion, which would combine the tensile strength of the iron in the lower part, and the resistance to compression of the concrete in the upper part, in a resistance to bending which would be due to the joint action of the two forces, and would almost infinitely surpass the transverse strength of either part of the compound beam, taken separately. Mr. Hyatt gave up for a time his experiments on this subject to devote himself to a process of making Portland cement secure against injury from fire by mixing sulphur with it; but, in a rather irregular and feeble way, many other persons have found that an iron skeleton, filled in with such concrete, gave an unexpectedly strong and durable construction, while the alkalinity of the cement keeps the iron buried in it, free from rust, for an indefinite period.

IN December last the Iowa Soldiers' Monument Commission advertised for competitive designs for a monument to be erected at Davenport, and as the invitation contained the statement that the commission reserved the right to "reject any or all drawings if in the judgment of a majority of its members none shall be of sufficient architectural excellence to merit a prize," we have no sympathy to waste on those who took part in it. Between the time of the close of the competition in April and the deciding of the contest, a few weeks ago, we received several inquiries from competitors who desired to know what was going on; and since the competition was decided we have received other letters from architects asking why their drawings were not returned, and from others complaining that they had been returned, but unaccompanied by even the cheap courtesy of a word of thanks or a statement as to how the affair had resulted. Such treatment is so usual that we wonder that architects who are willing to be bought and sold at the valuation any commission may put on them should think it worth while to lift up their voices in protest. As usual, home talent won, but the award had this of unusual about it, the successful competitor was a woman, Mrs. Harriet A. Ketcham, of Mt. Pleasant, Io., who is said, by those who saw the design, to have submitted a rather crude sketch of a monument closely following Rauch's great monument to Frederick the Great at Berlin, a very good model, perhaps, but one rather difficult to execute for the sum of $100,000 as fixed by the commission. Rauch's monument, which was made thirty years ago, in a country where labor was cheap and the needful facilities at hand, cost $187,000, and to-day it would probably cost $250,000 to do a similar work in Germany. On another page will be found the second prize design, and we can only regret that we are unable to show Mrs. Ketcham's design at the same time.

ARCHITECTS who have observed the construction of the so-called "Spanish vaults," of flat tiles, which are coming into rather extensive use about New York and Boston, will be interested to learn how far the system is a revival of a very ancient one. Professor Aitchison, in his Royal Academy lectures on Roman construction, mentions many instances where domes and barrel-vaults, both semicircular and segmental, were built of tiles laid flat, in two or three courses, breaking joint, and the haunches afterward filled up with rubble or concrete, and, to show that the tradition of this sort of work still persists in Italy, he says that in 1854, being near Florence, he saw a segmental barrel-vault, about eighteen feet in span, turned with a single course of tiles, set in plaster-of-Paris. No centering was used, "turning pieces" were set about six feet apart to give the form of the arch, and the workman held each tile in his hands until the plaster-of-Paris had set. The haunches were stiffened by small vaults, turned in the same way, and it was intended to concrete up the haunches, and lay a mosaic floor over the vault. The workmen told him that this construction was called "Volterran vaulting," and it seems to have anticipated in nearly every detail the "Spanish" vaulting of our day, in which plaster-of-Paris is also used for

jointing the first course, and with the same object, to enable the workmen to lay the tiles with a light portable centering, which, through the almost instantaneous setting of the plaster-of-Paris, can be shifted as the work progresses. Of course, the antiquity of the device does not lessen the value of the modern form, which, although it involves a great deal of ingenious and skilful adaptation to the requirements and materials of the present day, modestly disclaims any pretence of being more than a revival of an ancient mode of construction.

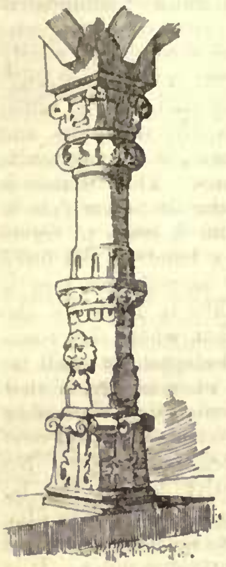
A CURIOUS experiment in railway management went into operation on the first of August, in Hungary. Most of the Hungarian railroads belong to the Government, and, through the advocacy of Dr. Engel, who has studied their operation very carefully, a plan has been carried out by the Hungarian Minister of Communications, M. Baross, by which the territory served by the Government lines, this being practically the whole of Hungary, is divided into zones, with the idea of making the price of tickets the same for any station in a given zone. As yet, the new principle has not been carried out to its perfectly radical conclusion, and two sets of zones are established, one called the local zones, and the other the general zones. In the local zones, the fare from one station to the next is the same, whatever may be the distance between the stations, the prices being set at twelve cents for first-class tickets, six cents for second-class, and four cents for third-class. As the stations in the remote districts are often ten or fifteen miles apart, the effect is to make travelling on the unfrequented routes much cheaper than in the more densely populated districts, although the fares, even in these, are moderate, according to our notions. From any station in the local zones to the next station but one, the fares are sixteen, nine and six cents, irrespective of the distance.

FOR general travel, the whole railway system is divided into fourteen zones, which are, so to speak, migratory, any given point being the centre of the system of zones for travellers starting from that point. Beginning at this centre, a circle with a radius of twenty-five kilometres, or fifteen miles and a half, forms the first zone. The annular space between this circle and another, having a radius of two hundred and twenty-five kilometres, or a hundred and forty miles, is divided into twelve zones; and the fourteenth zone comprises all the places within the railway territory beyond the circumference of the thirteenth. The fare from any zone to the next is twenty cents for first-class, sixteen for second-class, and ten for third-class; so that the traveller in the second-class cars, which are better than our ordinary cars, rides his first fifteen and a half miles for sixteen cents, but pays the same for each succeeding stage of ten miles until he reaches his fourteenth zone, where the distance he can go for the same price varies according to circumstances. All this seems very simple, but in practice the new system amounts to a complete revolution in the ordinary system of passenger tariffs. In all other European countries, as well as here, the practice is to carry passengers in the neighborhood of the large cities, where trains run frequently, and are crowded with people, very cheaply, while the unfortunate persons who live on the sparsely-settled routes are made to pay enormous prices for the privilege of riding in the few trains allotted to them. The same rule was followed in Hungary until Dr. Engel made a thorough examination of the results of the practice, collecting some curious statistics. He found that, taking the German railroad system as an example, the first-class cars run, on an average, with nine-tenths of their seats empty. In the second-class, four-fifths of the seats are unoccupied; and in the third-class about two-thirds. Comparing these figures with the weights of cars and trains, he found that the railway companies, for the sake of conveying one first-class passenger and his hand-bag, hauled, on an average, a dead weight of more than three tons; every second-class passenger rode on a ton and a half of expensive material, and every third-class passenger required more than one ton. Moreover, the cost of maintaining the road-bed, salaries of officials and interest on capital, was about the same for conveying one passenger to every ten seats in the trains as it would be if all were occupied; and the obvious conclusion was that if, by a change in the tariffs, four or five persons could be induced to ride in the sparsely-settled districts, where one rode before, the railways would make a profit with a greatly reduced rate of fare. Incidentally, therefore, the new system, while simplifying and equalizing rates, materially reduces the cost of travelling long distances. For example, the distance from Budapest to Fiume, on the Adriatic, is three hundred and sixty-one miles. A part of the route is apparently beyond the jurisdiction of the Hungarian railway administration, for the first-class fare is now three dollars and forty cents, while, if it had been all within Hungarian territory, nearly two-thirds of the distance would have been in the fourteenth zone, and the fare would be two dollars and eighty cents. Before the first of August the fare was fifteen dollars and twenty cents. So, from Budapest to Brasso, in Transylvania, the road is nearly all over Government lines. The distance is four hundred and fifty-three miles, and the first-class fare is three dollars, only twenty cents more than it costs to travel to the boundary of the fourteenth zone, a hundred and forty miles from the point of departure. The second-class fare is two dollars and forty cents. A variation is made in the uniformity of the tariff, by providing that when the route taken by any traveller passes through Budapest, he shall be considered as starting on a fresh series of zones from that point, but this is probably only for convenience in reckoning the price of tickets, and rather reduces the cost of the journey. Baggage is subjected to a tariff by distance and weight. No baggage is conveyed free, and any quantity desired can be taken, at the uniform charge of fifty centimes for every fifty kilogrammes for each fifty kilometres, or ten cents for one hundred and thirty-five pounds carried thirty-one miles. It is easy to see that, besides the revenue from the new baggage tariffs, which will be considerable, the trebling or quadrupling of the long-distance passenger business would make the profits greater at the low fares than they have been at the high ones, and Dr. Engel hopes it may prove, as it has in the postal service, that the increase will be so great as to more than make good the apparent sacrifice. So far, as *Le Génie Civil* says, the event seems to show the correctness of his views. Within the first few days after the first of August, the traffic on the long lines increased enormously. Where the average daily number of passengers arriving in Budapest over certain routes had been twelve thousand, it increased in two or three days to thirty thousand, so that some of the express trains were received in three sections, and there were not cabs enough in the city to take the passengers from the station. The railways throughout Hungary, not under Government control, seeing that they could not compete with the State roads, have given notice that they will also adopt the Government zones and prices; and *Le Génie Civil* believes that it will not be long before Austria, finding that people can go from Venice or Brindisi to Berlin through Hungary for half what it would cost to go through Austria, will be forced to follow suit; and perhaps the lines through the other portions of the Continent may find it for their interest to join.

AT a recent reunion of army officers at Odessa, one of the chief surgeons presented some statistics in regard to the Franco-Prussian War which we have never seen before. According to him, one million, one hundred and thirteen thousand, two hundred and fifty-four privates, and thirty-three thousand, one hundred and one officers, crossed the German frontier into France in 1870-71. Of these, one hundred and thirteen thousand, eight hundred and twenty-one were wounded, and four hundred and seventy-five thousand were taken sick. Seventeen thousand, two hundred and fifty-five, or only one and one-half per cent, were left dead on the field of battle, and eleven thousand and twenty-three died subsequently of their wounds; making twenty-eight thousand, two hundred and seventy-eight, or about two and one-quarter per cent of the invaders who died by the arms of the French; while fourteen thousand, six hundred and forty-eight died from diseases. Considering that the war lasted nearly two years, the total mortality, of about forty in a thousand, does not seem very frightful. Many a civilized city keeps up a yearly average of twenty-two or twenty-three deaths to each thousand inhabitants, and, although the German soldiers were men in the best of health, and admirably taken care of, so that the mortality among them should be very low, it is, at first sight, rather startling to discover that the mortality incident to the most important war which perhaps ever took place in Europe, was apparently no greater than would have resulted from putting the troops to live during the same space of time in New York tenement houses or in the poorer quarters of Paris.

BUILDERS' HARDWARE.[1] — XXXIII.

HARDWARE SPECIFICATIONS.



Column in the Court of the Residenz, Freising.

THERE are three methods of specifying the hardware to be used about a building. The first, followed very generally in Boston, is by allowances, the general specification containing clauses to the effect that the contractor is to allow so much per door and so much per window for hardware. It is well, in order to prevent mistakes or disputes, to add that the allowances are to cover the net cost to the builder, and that all the hardware is to be set by the contractor in addition to the prices named. This method conveniently disposes of the subject of hardware at the time of writing the specification, the whole matter being relegated to the time when the hardware is actually needed, the architect then making such selection as he sees fit, within the allowances.

The amounts of the allowances depend, of course, entirely upon circumstances. Very fair hardware for inside-doors can be had as low as $1.75 per door. This allows for bronzed iron butts, 60 cents; wooden knobs, escutcheons and roses, 65 cents, and a one-lever lock, 50 cents. This means, however, a cheaper grade of goods than would often be advisable. An allowance of $5 per door will permit of solid bronze hardware throughout, including bronze butts, $2.50; a good, three-lever, machine-made lock at $1; bronze knobs, $1, and bronze escutcheon and rose, 50 cents. For office-work an allowance of $6 per door will provide a "Yale" lock with corrugated key, a spring latch, and bronze butts and knobs. For front-doors the allowances must be considerably increased. The lock ought to be of a grade costing not less than $4; the bolts, $2.25; the knobs, $2, and the butts, $6, or a total allowance of $14.25. For closet-doors, bronze butts and knobs and a small lock would average $3.50 per door, only one knob being necessary. $4 each is sufficient for sliding-door hardware, exclusive of the hangers, with latch only, or $5 with latch and lock. For fly-doors add $9 per door to the hardware allowance if the butts are of bronze, or $4.50 if of bronzed-iron. This is for housework. For office fly-doors $12 should be added for bronze butts, and if push-and-pull plates are required an additional sum of $2 will be required.

For French windows $4 will buy two pair of bronze butts, and $2.25 answers for the bolts and the lock, making the total allowance $6.25 per pair. Door-transoms should have an allowance of $4 each, for nice work, which would purchase pivots or 3½ inch butts, $1.75; chains and catch, 75 cents, and lift, $1.50. Transoms are often hung with painted butts which are less conspicuous than bronze, and the total allowance can be scaled down as low as $1 for very simple work.

Sashes are trimmed for 50 to 75 cents each, though the allowance price is usually per dozen fixtures, say $4.50 for fasts and $2.50 for pulls.

A specification which would, therefore, provide for bronze hardware throughout an ordinary dwelling, of a good, average quality, might read somewhat as follows.

HARDWARE. — Allow in the contract the following sums to be expended as the architect directs upon hardware:

Front-doors,	$15.00 each pair.
Back-doors,	6.00 each.
Inside-doors,	5.00 each leaf.
French-windows,	5.00 each leaf.
Sliding-doors,	4.00 each leaf.
Closet-doors,	3.50 each.
Transoms,	2.50 each.
Sash-fasts,	4.50 per dozen.
Sash-pulls,	2.50 per dozen.

These prices are the net cost to the builder, and the owner is to have the benefit of any reduction therefrom. Beyond these allowances list and set all the hardware in proper manner; also provide and set such other hardware (in pantries, closets, etc.) as are called for or implied by the plans or specifications.

Sliding-doors to be hung by (Richards, Prindle, etc.) hangers running on (wooden, iron) tracks, properly adjusted, with proper centre stop.

[1] Continued from No. 714, page 95.

The hardware for blinds, cellar bulk-heads, etc., is best specified in connection with the individual items, and should be described exactly, as the prices of the different makes vary greatly.

The allowance method is a very simple one for the architect, and when carried out according to the true intent and meaning of the specification, answers very well for ordinary housework, especially as each contractor usually purchases his hardware of one firm, and the architect can then simply select from a single assortment of goods. The difficulty of such a system, however, is that the goods seldom cost as much as the allowances, and the difference goes to the contractor instead of to the owner, where it belongs. No architect has yet fully mastered all the intricacies of a hardware manufacturer's price-list, and as the price of each article is based upon so flexible a sliding-scale that even the builders are sometimes charged unevenly, there might be a dozen grades of knobs or locks, all at the same nominal price, though varying greatly in quality and in the real amount for which the dealer sells them.

Also, the system of allowances as ordinarily followed gives too much liberty to the contractor, who usually submits to the architect one or two styles of knobs and locks which he will furnish for the allowances, so that the hardware often expresses the builder's rather than the architect's ideas of door-trimmings. There may be a hundred things in the market far better and at less cost than those offered, and while such a specification as the one quoted gives the architect the right to choose his hardware anywhere, in practice he is generally quite willing to shove an irksome job onto the shoulders of the contractor. In fact, the system of allowances is good only at its best.

In New York it is customary to be much more exact in the hardware specifications. No prices are given, the various articles being designated by sizes and by reference to some particular class of goods which is to serve as a standard. Thus: —

For inside-doors provide and set solid bronze 4½ inch loose-pin butts, two to each fold. Outside-doors to have three 6 inch loose-pin bronze butts.

Likewise for locks: —

Closet-doors to have 3½ inch locks; main inside-doors, 4 inch upstairs, 4½ inch downstairs; front-doors, 5 inch. Closet-door locks to have one lever, other doors all three levers; front-door in addition a night-latch and antifriction strike. The works of all locks to be of (brass, steel), with steel keys and (brass, phosphor-bronze) springs. Door-knobs in service portions to be plain, white porcelain, with black enamelled-iron roses and escutcheons; elsewhere to be plain, solid (or spun) bronze, with bronze roses and escutcheons, etc.

It is usual to describe knobs and miscellaneous fittings by referring to a catalogue or to samples in the architect's office, adding "or of a similar quality satisfactory to the architect."

It will easily be understood that in order to write a proper specification for hardware on such a basis as this, the architect must not only know and keep in mind all the numerous fittings necessary for a house, but must also be thoroughly posted on the possibilities of the market. As a matter of fact it is generally easier to call in a hardware man and ask him to write the specification, and the way in which such a method of specifying will fail will be in not being sufficiently general to cover everything, so that the contractor will have an excellent opportunity to bring in a big bill of extras at his own prices. Besides, a specification by sizes referred to a catalogue, "or something equally good," is by no means absolute. The difference between really good and absolutely bad hardware is often so effectually concealed by a superficial finish that, although the architect may refer to the best in the market and mean to have it, an unscrupulous contractor might run in inferior goods which only the closest, technical inspection would detect, though the difference would be speedily manifested in the wear of a few months. Even restricting the choice to the goods of a single firm is not always sufficient to prevent imposition, as there are, unfortunately, some manufacturers who make goods to suit the consciences of all sorts of customers, and have no fixed standards of either quality or price. In time the architect will discover these points by sad experience, and will grow very cautious; but the younger men, the householder and those who are either too indolent or too busy to properly attend to such details, will be more imposed upon by the New York than by the Boston method of specifying the hardware.

The third method is the only one which is really absolute, or by which the architect is sure of what he obtains. It has been adopted very largely by the Government in obtaining

bids for public work, and, though quite clumsy at first, is the surest and easiest way in the end, relieving the architect from a great deal of bother and entirely obviating any discussion as to either prices or qualities. There is no reason why the same system should not be followed in connection with every building of sufficient size to warrant it. The specification calls for locks, butts, etc., of certain sizes, descriptions and weights, and requires that a full line of samples shall be submitted, with prices of each. These samples are then examined carefully, a selection made therefrom or others substituted if none are exactly suitable, and the contract is based directly upon the samples. It remains, then, only for the superintendent to insist upon having the identical fixtures referred to, allowing no leeway for anything "equally good," or "of similar quality."

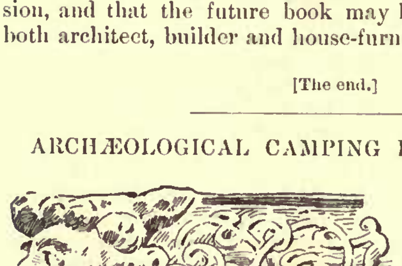
For small dwellings the method of allowances is very convenient, giving the architect full liberty to change his ideas to suit the work or to introduce any article which seems advisable, without being obliged to determine every detail in advance. But for all heavy buildings the Government method is better and fairer for both architect and contractor. The former can decide just as well first as last what he wants, and the hardware being all selected several months in advance, the contractor has ample time in which to make the best terms for the wares, and any delay in purchasing is then due solely to himself, while the question of price is definitely settled before any contract is signed. It is then the contractor's business alone how much he pays or how much discount he obtains, or what commission he receives for placing his order with the retailer, and so long as he matches the samples agreed upon, no one has any just cause for complaint.

In concluding this series of papers upon the subject of Builders' Hardware, the writer desires to acknowledge many sins of omission and commission which have been almost unavoidable, considering the complexity of the subject, the difficulty of ascertaining the condition and scope of the market, and the uncertainty of definite deductions. It has been written with special regard to the possibilities of the Boston market, but, at the same time, the goods of nearly all the manufacturers in the country have been studied and compared, so that it is believed the series will have more than a local significance. A number of excellent fittings have been discovered too late for insertion here, but it is intended to incorporate such, so far as possible, in the republication of these articles in book-form. The most the writer can hope is that he may help to relieve a little of the drudgery inseparable from the architect's profession, and that the future book may have a reference value to both architect, builder and house-furnisher.

C. H. Blackall.

[The end.]

ARCHÆOLOGICAL CAMPING IN ARIZONA.[1]—VI.



AT this camping-place we had a scarcity of good fuel for our fire, for the Pimas had cut about all the mesquite off their reservation, and our thicket turned out to be chiefly palo verde (green wood), so called on account of the vivid green of its smooth bark. The Spanish name for the large shrub commonly called greasewood, which is one of the most abundant growths in this region, is the "*hediondillo*," a word more euphonious than pleasantly suggestive, for it means "little stinker." The application of this name to the greasewood must be taken as evidence that the Spaniards must have encountered it before they did the palo verde, or at least before they had ever tried the experiment of making a fire out of the latter, for in burning, the palo verde, especially when dry, gives off a stench of unspeakable vileness. Therefore they would naturally have called it the "*hediondo*," with never a thought of designating the harmless greasewood with its diminutive. The latter, though pungent, is not particularly disagreeable, for its odor is cleanly and somewhat resembles the extract of witch-hazel. Some palo verde, which was inadvertently put on our fire, had the effect of driving us beyond smelling range until it could be removed. The fire was then kept up with sage-brush, which, burning very quickly, was gathered in large quantities and constantly added. It makes a wonderfully brilliant flame, burning with intense brightness and no perceptible smoke. By the way, it would be well for everyone who has occasion to go to the far West to remember the remarkable qualities of the sage-brush as a febrifuge. A tea made of its leaves has cured some of the most violent cases of what is known as "mountain fever," and it might prove a blessing were it extensively introduced in medical practice.

[1] Continued from No. 714, page 102.

We were favored with a week of moonlight, and that night, when the moon was near the zenith, Mr. Cushing and I went out towards the ruins with shovels on our shoulders, for, said he, the moonlight, with the black shadows which it casts, brings out on the ground in sharp distinctness from the white light the traces of the lines of house-walls so far obliterated by time as to be indistinguishable in the broad light of day. It proved to be the case, and the dark lines could be seen extending out over the ground in the mild light. Selecting a favorable spot, we soon encountered pottery remains, after which satisfactory result we returned to camp, knowing where best to look the next morning.

Early in the evening we heard a great howling in the distance, coming across the fields from the direction of the river. The next day we learned that one of the leading Pima chiefs, in consequence of a too liberal indulgence in "tiswin" — a beverage made from the fermentation of corn — had fallen upon a stick and impaled himself, and the howling we heard was the lamentation of the women of his village over his death. The proceedings were probably very similar to those of the Irish wake, which is a survival from a condition as primitive, probably, as that of these Pimas. Finally the wails died away, only to be succeeded by a more staccato and vivacious performance on the part of coyotes, whose yelping seemed like a commingling of an animated ward-caucus, a field-day on the New York stock-exchange, and a hotly contested dog-fight.

Some time was spent the next morning in excavating the ruins of Las Cenizas, where burned roofs and the abundance of cinders found in the excavations indicated that the place had, like Los Muertos, been overwhelmed by an earthquake. We found some interesting remains of pottery, etc., but the time at our disposal was too short to allow more than a reconnoisance, and shortly after nine o'clock we were under way. We passed another trading-post at Agua Dulce, or Sweetwater, and at noon we reached the main agency of the reservation, where we were courteously received by Major Howard, who at that time was agent for the Pimas. The reservation buildings were very substantial and extensive, making an impressive appearance, almost like a fortified post, when seen from a distance, as they loomed up across the plain. There is a missionary at the agency, and the net result of something like ten or eleven years' labor is one convert among the Pimas! We passed several Pima villages, composed of a few clustered huts, and as primitive in their surroundings as the burrows of so many prairie-dogs. Towards the end of the reservation we came to a small Pima cemetery, surrounded with stakes, the enclosure in the form of a square, with an entrance in the centre of each side, representing the gates of the four regions: north, south, east and west. The graves were covered with sharp, thorny branches to keep away the coyotes. Shortly after that we came to Walker's ranch, a fertile farm irrigated from the river, and with a fine orchard. Casa Grande lay about a mile to the southward, and, after passing the remains of a great irrigating-canal which showed how extensive must have been the population which it supplied, we came in sight of the most celebrated ruin in the Southwest. It is a striking-looking structure, and as picturesque in its way as the ruins of a mediæval castle. It grows upon one with acquaintance. I have seen no photographs that give a just idea of its character, except some large ones which express admirably the massiveness of the building, making it look very much like a natural formation; so much so that many people, on seeing these pictures, have asked if it were a view of some great rock carved by the elements.

The best view of Casa Grande, from an artistic standpoint, is that from the place where we pitched our camp, in a clump of mesquites in the hollow of an ancient reservoir, a short distance to the eastward. Standing here, the building is framed-in by the low-arching boughs of the trees, it rises from a terrace-like base formed by the crumbling away of the low buildings and thick walls that surrounded its exterior court, and the extent of the ruins flanking the main structure to the right and left, evidently once connected with it, but now detached by the crumbling away of intervening sections, is best seen from this point.

We had supper soon after pitching our camp, and had been counting on an appetizing addition to our regular fare. We had seen the wild Nopal or Prickly Pear growing here and there in the desert, and on my telling the Doctor what a delicacy it was in Mexico, with the disc-like leaves fried like the egg-plant, it was agreed to gather some and try them for supper. The leaves, bristling with prickles, are skittish things to handle, but by cautious proceeding we managed to detach a goodly quantity with a large hunting-knife, and, having nothing else to carry them in, we poked them gingerly into a clean bathing-towel which the Doctor had in his bag. At camp we found the towel utterly ruined, being stuck through and through with fine prickles: it would have made an excellent garment for a martyr, but as none of us was prepared to assume that rôle, there was nothing left but to thrust it into the fire. Then the question was, how to remove the prickles from the Nopal leaves, for in spite of the condition of the towel, their number did not seem in the least diminished. It was concluded to throw them into the fire also, and scorch off the

prickles, just as they do to prepare them to be eaten by sheep in Mexico. This treatment was effected, and we easily peeled off the blistered skin. Then rubbing them with corn-meal they were placed in the frying-pan. A delightful odor arose, and as they were set before us, hot and beautifully brown, our mouths watered in anticipation. But alas! they were tough, stringy, and horribly bitter, and then it was I remembered that it was only the tender young leaves that the Mexicans ate, while these had been gathered in winter, after a season's maturity.

That night, in the full moonlight, the Casa Grande assumed a soft, poetic beauty, with its ruddy surface flooded with radiance that threw the shadows of its deep recesses into a rich mysterious obscurity — a transformation from the aspect of the ruins in the broad glare of daylight. While we lay in our tent, gazing dreamily at the beautiful picture, Mr. Cushing told us in his charming and inimitable manner one of the Zuñi folk-tales about the "Priests of the House" — a tale whose full significance was not clear to him until he came to this region and found the ruins of the "Great Houses." As we listened, the ancient walls before us seemed to be repeopled with the venerable old priests, and it would have required little imagination to have heard the weird, fascinating chants of the worshippers. Late in the evening I strolled through and around the ruins with Mr. Cushing. The walls are remarkably massive, and must have made an impregnable citadel of the structure for its builders. At the base the exterior walls are almost seven feet thick; their inner side is perpendicular, and outside they slope gradually inward, making their width at the top where they have remained in good condition and not been eroded away, something like two feet less. The building has probably suffered more within the past ten or twelve years from the vandalism of tourists and other predatory visitors, than within the previous three centuries since the coming of the Spaniards into the land. The few remaining timbers of pine and mesquite have been carried away by relic-hunters, and the walls so weakened that they have partially fallen, and other portions have become so undermined that they soon will fall unless measures are taken for their preservation. Fortunately this is now likely to be done. It providentially happens that the building stands on what is known as a "school section," that is, one of the square-mile sections of land reserved in every township by the land-law of the National government, for the benefit of the school-fund of the Territory or State in which it is situated. There are two of these sections in every township: Nos. 16 and 32. Casa Grande stands upon Section 16 in Township 5 South, Range 8 East, a little over two miles south of the Gila river. These sections cannot be sold until a Territory becomes a State, so that, although the neighboring country for miles around is coming under cultivation, and eagerly preëmpted on account of its wonderful fertility, this section cannot be taken up, and the rough nature of the surface, on account of the many ruins, has prevented its being squatted upon.

Fortunately the preservation of this ruin, so precious on account of its being the only standing example of this important class of structure peculiar to the ancient town-dwellers of the Southwest, and its consequent inestimable value for archæological study, is now assured. Mrs. Hemenway, who is the institutor of the expedition, perceiving the importance of this step, last winter set about making earnest efforts to secure from Congress measures for its preservation; and ably seconded by Mr. Cushing, who spent several weeks in Washington for that purpose, though suffering from serious illness at the time, legislation was obtained setting aside, as national property, the land on which the ruins are situated, including not only the section itself but enough of the surrounding land to take in the remains of the old city in the midst of which Casa Grande stands. An appropriation of $2000 was also made for the protection and care of the building, and it is hoped that another Congress will continue the good work by providing for repairs that will ensure its complete preservation.

The walls are of adobe bricks, but are built in the same style as that of the temple at Los Muertos, which I described in a previous article — concrete laid between coarse wicker-work woven through rows of stakes, which are afterwards enclosed in the walls by thick plastering outside and in. The only floors in the building are formed by the fallen débris which covers the ground unevenly in the interior. There is a tower-like section in the centre, four stories high above the ground, and surrounded by a portion now three stories high. There are evidences that the walls have crumbled away for a story, and as there are probably two additional stories now below the ground, on account of the accumulated débris, it is likely that the building was seven stories high in the centre, and six in the main walls. Mr. Cushing's investigations show that there is a natural law regulating the gradual decay of buildings, just as of the wearing-away of the earth's surface.

The soil hereabouts contains a sort of natural cement, so that when used for building-purposes, by mixing with water, it becomes very hard. The walls of Casa Grande are almost like stone. The interior is still covered with a smooth polish that almost seems like a glaze. It was probably done in the same way that the Indians polished their pottery so finely, by rubbing the surface with a smooth stone. The exterior still shows traces of the coloring of its walls that gave it the name of "the Red House." As a primitive people rarely, if ever, does anything willfully, but attaches some significance to the way in which the most trifling things are done, it seems as if this coloring must have had some religious meaning. Possibly they may have given their Great Houses the sacred color belonging to the region to which the location of its city in the group of cities would assign it. Under this hypothesis Casa Grande would have belonged to the city of the South, if the colors of its people were the same as those of the Zuñis of today; while if Casa Blanca really gained its name from the color of its walls, it would be the Great House of a city of the North, in another group. It is possible, however, that with its ancient people the order of the colors were quite different from that of the Zuñis, for the ideas governing such things appear to change with environment, and among cognate Indian peoples today the order of the colors assigned to the seven regions varies considerably.

It is probable that the lower rooms of these great buildings were used for storage purposes, particularly as granaries. A most important archæological feature was pointed out to me by Mr. Cushing. Readers of the *American Architect* may remember an article published in this journal several years ago, describing an important observation by Mr. Cushing, concerning the development of the door among the Zuñis. The etymology of their word for door showed that its meaning was, literally, "a wooden stone close," indicating that before the introduction of wood-working instruments of metal by the Spaniards they were unable to make doors of wood with their stone implements, but closed the openings with slabs of stone. These ancient "stone closes" were subsequently found by Mr. Cushing when investigating some old ruins. Closing up a doorway between two of these rooms in Casa Grande was a huge block of adobe, fitting the opening accurately and with smooth surfaces and true edges. This "stone close of earth," as it might be called, was probably made by moulding it in a great basket made for the purpose. It would seem to have been extremely difficult to move such a ponderous mass in opening and closing the passage, but they probably had some simple and effective means of accomplishing it. In this alluvial region, of course, earth was the most available material to make doors of, for the transportation of stone slabs from the mountains would have been too great a task.

Father Kino, who visited this place in 1694, as a Jesuit missionary, relates that the Pima Indians, who lived in the neighborhood, told him that the Casa Grande was already in ruins "five old men's lives before," which would be 500 years; and they told him that it was once seven stories high, which would accord with Mr. Cushing's deductions from personal observation.

Father Mange, who accompanied Father Kino in 1697, on his second visit, wrote: "The principal room in the centre is four stories high, and those adjoining it on its four sides, three stories, with walls three varas [a vara is about two feet] of strong *arganasa y barro* [mortar and clay — the natural cement in the soil gives the appearance of the use of mortar], so smooth on the inside that they resemble planed boards, and so polished that they shine like Pueblo pottery. The corners of the windows, made square, are very straight and made without supports or cross-pieces of wood. They look as if made with a mould. The doors are the same, though narrow. By this it is known to be the work of the Indians. The exterior is 36 paces long by 21 wide. It is well built. At the distance of an arquebuse-shot are seen 12 other buildings, half in ruins, also with thick walls, and all the roofs burned out except one low room, which has round beams apparently of cedar, small and smooth, and over them reeds of equal size. On these was laid a layer of hard mud and mortar, forming a very curious roof or floor. In the vicinity are seen many other ruins and heaps of rubbish covering the ground for two leagues, with much broken pottery, plates, and jars of fine clay painted in various colors. It resembled the Guadalajara ware." He also described "a canal which runs from the river over the plain, encircling the settlement, which is in the centre, and is three leagues [a Spanish league is about 2½ miles] in circumference," and he described the canal as ten *varas* wide and four deep, carrying perhaps half the river. It thus served as a defensive ditch, as well as to supply water for the houses and to irrigate surrounding fields. Father Font, another Jesuit, gives the following account, with more accurate details: "The site on which this house is built is flat on all sides, and about one league from the Gila. The ruins of the houses extend for more than a league to the cardinal points. . . . Round about there are ruins indicating a fence or wall which surrounded the house and other buildings, particularly in the corners, where it appears there had been some other edifice like a castle or watch-tower, for in the angle which faces towards the southwest there stands a ruin with its divisions and an upper story. The exterior plaza extends north and south 420 feet, east and west, 250. The interior of the house consists of five halls, the three middle ones being of one size, and the two extreme ones longer. The three are 26 by 10 feet, and the others 38 by 12. All are 11 feet high. The outer doors were four by ten, the inner ones half that. The outer walls were six, and the inner four feet. The house is 70 by 50 feet, the walls sloping slightly on the outside. . . . Before its eastern door, separate from the house, there is another building, 26 by 18 feet, not counting the thickness of the walls."

Capt. Richard Hinton had an interesting article on the Casa Grande and other notable ruins of the Southwest, in *Harper's Weekly* for May 18, 1889. It is to be regretted that he called his paper by the romantic but inappropriate title of "The Great House of Montezuma." The Montezuma myth of the Southwest has been shown to have been pure fiction, — a legend put into the mouths of the natives by the early Spanish missionaries through a misapprehension. The name was never heard there until the Spaniards

brought it from Mexico, and the Aztec monarch had no more to do with the natives there, than with the Algonquins. Capt. Hinton alludes to the account by Capt. A. R. Johnson of the Kearney New Mexico and California expedition in 1848, who gave a clear description of what he observed here, including among his description of the surroundings a circular embankment 600 feet to the northwest of Casa Grande, which Kino and Bartlett held to have been the enclosure of a corral, while he regarded it as the wall of a great well or reservoir. Captain Hinton could find no trace of this at the time of his own visit; only an irregularly-shaped mound of the usual grayish earth-material. Nevertheless it is still there, and is the remains of one of the "sun temples" heretofore described; only it is not circular, but boat shaped, and its plan is fairly well given in the illustrations from Johnson's sketches in *Harper's Weekly*, as the "Ground-plan of Ancient Structure or Enclosure." Captain Hinton also says that Johnson's special find cannot now be found. "None of the missionary explorers mention it, either. That was a terrace but a few yards to the north of the supposed well or corral. According to the Captain it measured 300 by 200 feet, and was five feet high. On it in the centre was a pyramid eight feet in height, and with a summit platform of 75 feet square. Captain Johnson, who was killed soon after at San Pasqual, California, bore a high reputation, but no else has ever seen, outside of Central America or Central Mexico, any remains of that character." Captain Johnson was, after all, correct in his observation, but not in his deductions. Owing to the irregularity of the surface caused by the various ruins of the neighborhood, this so-called terrace would escape the attention of a casual observer; but, on the very spot that he mentions, there is a huge mound formed by the gradual decay of a great building, whose successive stories in their fall have given the appearance of terraces.

Our party made some important investigations in the neighborhood of Casa Grande, but the site is a peculiarly difficult one for excavations, and the ground needs to be taken hold of systematically to secure satisfactory results. Much harm has been done by the operations of random amateur explorers and relic-hunters, who have scratched and burrowed a little here and there; and it is fortunate that this will be put a stop to by the recent action of Congress looking towards the protection of the ruins.

A few miles to the eastward of Casa Grande we camped at another ancient city, where a portion of the walls of one building was still standing. There were the usual features of the central temple, or citadel, in a mound of ruins, and a large Sun Temple. Our experimental excavations yielded some excellent results, in the shape of a number of jars containing cremated remains from a pyral-mound, together with several valuable smaller articles.

At Florence, the seat of Pinal County and the trade centre for the middle Gila valley, we renewed our supplies and proceeded farther southward. Florence is about ten miles easterly from Casa Grande, and is a comparatively new place. Its superior site was the cause of the entire abandonment of the neighboring town of Adamsville, a few miles down the river on the road to Casa Grande. The latter place, on passing through, presents a singular spectacle for a growing new country, with its silent city-like street with tenantless ranks of substantial adobe buildings.

The situation of Florence is pleasingly picturesque. The Gila River breaks out of the mountains a few miles above, between two grand buttes of rich, ruddy hues and architectural aspect; fascinating at all hours of the day in the changing shadows that heighten the brilliant sunlight flooding their perpendicular sides. To the northward and eastward the lofty Superstition and Pinal Mountains rise in unbroken ranks; in other directions the mountains stand in isolated groups. The Gila Valley is very rich, and its fine state of cultivation near the town makes it most attractive to the eye. The mesquite trees standing here and there in the irrigated fields are notable by reason of the contrast of their graceful proportions, reaching to a height of 40 and 50 feet in consequence of plentiful watering, to the scrubby and scrawny growth of the same tree in the desert.

There is a great irrigating-canal built on a scale rivalling the ancient works of this country, to supply the extensive plains on the south side of the river; its capacity is sufficient for 140,000 acres. The upland plains southerly from Florence are frostless, owing to the direction of the air-currents determined by the surface conformation and the position of the neighboring mountains. In this dry interior region there usually falls a sudden chill immediately with the setting of the sun; but so great was the warmth of these air-currents that one evening, when the Doctor and I had not been able to find the rendezvous appointed with the rest of the party, who had come on more slowly behind, we drove about for two or three hours in the glorious calm moonlight in our search, and I felt no occasion for adding to the light summer clothing I was wearing that January day. In our camps, too, the nights were wonderfully mild, and we felt no need of shelter whatever. That day, as we drove southward from Florence, the plains presented a sight of most refreshing beauty. There is always more rain near the mountains than farther out in the valley, and as we approached the Picacho group we suddenly found ourselves entered upon a belt of lovely verdure: for miles on either side the plain stretched away in a floor-like evenness, tenderly green with a mantle of young grass, while the mesquite-trees, standing sparsely here and there, were covered with their soft, feathery foliage, untouched by the frost. When these uplands are brought under irrigation they will make the finest kind of lands for oranges and other semi-tropical fruits.

Crossing through a pass of the Picachos that afternoon we beheld a rare spectacle; upon the verge of a crag towering several hundred feet above us there stood, sharply outlined against the sky, the noble form of a mountain sheep. He stood perfectly motionless for several minutes, surveying the country like a monarch of the mountains, with head held proudly and great horns curving backwards. We stopped, the Doctor hastily seized his rifle and crept stealthily up towards the cliff. He fired, and as the sharp report rang out on the still air the beautiful animal turned, and in one superb bound disappeared from sight. I was not sorry that the distance was too great for even such a skilled marksman as my companion.

The valley on the other side was that of the Tortolitas, and there we found the remains of other ancient towns, notable for being beyond the line of river irrigation, and therefore dependent on the storage of water from the torrents pouring down from the mountain-sides.

From this point we returned to Camp Hemenway by way of Florence, taking nearly two days for the trip, and arriving with a color on our cheeks that in depth of brown rivalled that of our Mexican companions. SYLVESTER BAXTER.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE FOR A. W. NICKERSON, ESQ., DEDHAM, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued only with the Imperial Edition.]

SECOND PRIZE DESIGN FOR THE IOWA SOLDIERS' MONUMENT. MR. ROBERT KRAUS, SCULPTOR, BOSTON, MASS.

THE monument was intended to be of Quincy or Concord granite, sixty feet from the ground to the crown of the head of the upper statue, twenty-two feet in diameter at the lower base or with the steps about thirty-six feet, and fitly proportional as it rises. The figures in front represent Liberty and Union as the objects for which the soldiers fought. Around the die are arranged the figures of soldiers, not standing as inanimate statues, but as symbols of the perils and glories of the battle-field — the fearless charge, the alert courage, the heroic valor, which distinguished the Union armies, the intrepid advance where comrades had fallen before them, the dauntless officer seizing the flag when the color-bearer fell dead in his arms. The figures in this extended group represent infantry, cavalry and artillery; the monument, surmounted with a figure with a flag in one hand and a palm branch in the other, the emblem being "Victory to our flag." The bands around the shaft to contain the names of the battle-fields where Iowa soldiers were engaged, as Jackson, Corinth, Shiloh, Fort Donelson, Atlanta, Vicksburg, Pea Ridge, etc. The spaces between the palm branches on the lower base to be inscribed with the names of the regiments, divisions and batteries, their loss in officers and men. All figures to be of standard bronze, *i. e.*, twenty per cent copper, five per cent spelter, and five per cent tin. The cost of the monument completed and set up would be $100,000.

HOUSE FOR MR. MILBANK, GREENWICH, CONN. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

THE house is on a bluff, with a far view of the Sound. The side shown is the entrance porch side towards the town. The house is built of light brown stone, first story, with graduated shingle work above and ornaments in solid carved wood. The interior is blessed with huge fireplaces of the old-fashioned type, 6'.0 in the opening, and the finish is oak and white. The house is being built under the direction of James P. Niblo, builder.

DESIGN FOR A HALF-TIMBER HOUSE BY MESSRS. W. H. ORCHARD AND E. S. GORDON.

THESE designs were placed first and second in a recent competition of the Rochester Architectural Sketch Club.

CHURCH, ALEXANDRIA, VA.

SPECIMENS OF WROUGHT-IRON WORK, SKETCHED BY MR. WILLIS POLK, SAN FRANCISCO, CAL.

OFFICE-BUILDING FOR THE LANING ESTATE, WILKES-BARRE, PA. MR. M. B. HOUPT, ARCHITECT, WILKES-BARRE, PA.

OLD COLONIAL WORK OF VIRGINIA AND MARYLAND.[1] — IV.



Town Hall. Konstanz. Ger.

SIR FRANCIS WYAT, a young Irish gentleman, coming out as Governor in 1621, was charged to see that the Church of England and the laws of England were respected in his province; to suppress gambling and drunkenness; to punish pirates; to teach the savage heathen; to regulate the dress of the colonists, permitting only councillors and heads of hundreds to bedeck them in gold lace, and forbidding any to appear in silken clothes until Virginia should grow the silk; to cultivate corn and the grape; to regulate the excessive growing of tobacco, not allowing indentured servants to forsake their trades to plant it; to build water-mills; to make pitch and tar; to explore the country for precious minerals; to take a census of the colony — and, much more, tending to promote the general welfare of the settlement.

With Wyat came George Sandys, Treasurer of Virginia, and brother of Sir Edwin Sandys of the London Company, who was, according to Pope and Dryden, one of the first versifiers of his time, an Oxford man, and a great traveller in Europe and the East.

Eighty Irish immigrants settled at Newport News, and three thousand five hundred settlers in all came out during 1621 and 1622.

The colony at this time exported yearly twenty thousand pounds of tobacco, almost the entire crop. Before the end of the century the annual shipment of tobacco to England amounted to fifteen millions of pounds, the revenues from which aggregated £100,000.

At noon on Friday, the 22d of March, 1622, the Indians, in several bands, fell upon the James River settlements, and in a few hours butchered three hundred and forty-nine men, women and children. The paralyzing effect of this terrible massacre, in which fell about one-twelfth of the whole population, was long felt in the colony. Among its immediate results was a strong reawakening of the dread and hatred of the Indians which the philanthropic efforts of such men as George Thorpe, Deputy of the College land, Sandys and others had nearly overcome. Thorpe himself was one of their first victims, being slain at Berkeley with ten other persons. Opechancanough, the instigator of this awful treachery, had been living in a fine house built for him in the English fashion by Thorpe upon the College lands. "The chief was so charmed with it, especially with the lock and key, that he locked and unlocked the door a hundred times a day."

King James seized upon the pretext of the massacre, when news of these dire events had reached England, to institute an inquiry into the affairs of the Virginia Company, which finally resulted in the annulling of their charter, after a prolonged struggle, in 1624.

"The company thus dissolved had expended one hundred and fifty thousand pounds in establishing this Colony, and had transported nine thousand settlers without the aid of government. The number of stockholders was about one thousand, and the annual value of exports from Virginia was, at the period of the dissolution of the charter, only twenty thousand pounds."

Among its members were "fifty noblemen, several hundred knights, and many gentlemen, merchants and citizens." "Among the leaders in its courts were Lord Cavendish, afterwards Earl of Devonshire; Sir Edwin Sandys; Sir Edward Sackville, afterwards the celebrated Earl of Dorset; and, above all, the Earl of Southampton, the friend of Essex and the patron of Shakespeare."

In March, 1625, died King James the First, and his son, Charles the First, succeeded to the throne. The settlements on the James River had now reached the "Falls," where the advance-guard of pioneers had built them a few rough cabins within the fortified enclosure of the prescribed stockade. Near "Powhatan," a few miles down the river, fifteen thousand acres of land had been laid out for the benefit of the University of Henrico, and a few settlers were living there.

At Falling Creek were the ruins of the furnace and other buildings erected by Berkeley, who intended to engage in the smelting of lead and iron here, but burnt by the Indians in the late uprising. The mine from which he is said to have taken valuable ore has never been found. Farther down, upon a narrow neck of land encompassed within a horseshoe bend of the river, at "Dutch Gap," was the City of Henricus, fortified behind two strong palisades stretching across from river to river. The town stood well out on the peninsula and had three streets, a church and an Indian College. Along the river below were Fort Patience and Mount Malado, and still farther down the stream were Bermuda Hundred, Flowerdew Hundred, Wyanoke, West and Shirley Hundred, Berkeley, where Thorpe was killed, Westover and Martin's Brandon.

"This group of cabins on the banks of James River," says Cooke, "was the advance-guard of civilization, a sentinel posted on the look-out. It would not do for the little band of English to relax their vigilance. Human wolves were lurking around them, ready to spring upon them at any moment, and life was a hard struggle with disease and famine." The settlements were far apart, each was surrounded with a palisade, and in the year immediately succeeding the great massacre every one was on the alert, danger was ever present. Their houses were of a rude sort, generally built for comfort and defense, and with small regard to appearances. They were mostly of wood. "The stalwart planters go to and fro on horseback," but mainly get about by way of the river.

Some of the more important houses had, even at this early day, some pretensions to elegance and were of fairly good size. They were furnished with movables brought over from the mother-country.

"Here is the smiling lady of the manor in a huge ruff, with high-heeled shoes and a short skirt, coming to welcome us, and behind her is her spouse, the hearty planter himself. He is a commander and head of a hundred, so he wears 'gold on his clothes' as the law entitles him to do (1621), others are forbidden that. His official duties are responsible ones. They are to 'see that all such orders as heretofore have been, or hereafter shall be given by the Governor and Council, be duly executed and obeyed' in the hundred which he commands (1624). He is also a 'commissioner' or justice of the peace, to determine all controversies under the value of one hundred pounds of tobacco. Thus the worthy X— is military commander and civil magistrate, executive and judge of the little community; a royalist in sentiment, as everybody is, a Church of England man, and a hearty hater of things papistical and of dissent. . . .

"A little society huddled together in the peninsula between the James and York; dependencies reaching into the wilds; on the rivers gold-laced commanders rowed swiftly by indentured servants; on the outposts pioneers watching against attack; everywhere strong contrasts of white, red and black; the society composite, but harmonious; the Church of England the only religion, though dissenters will soon intrude; the test-oath against papacy demanded of every new-comer and official; the Assembly protesting against the claim of the Governor to tax them by proclamation; men in armor going to harry the Indian settlements in spring and autumn; public officials losing their ears; double engagements between men and maids punished with fine or whipping — this is the queer old society which we have looked at. The whole is English in warp and woof. These Virginians of the early times read English books, wear English clothes, eat from English plates with English knives and forks, and follow England in all things. Their church is the Church of England; the Governor is the representative of the King of England; his Council is the English House of Lords, and the Burgesses the English Parliament. . . .

"They were simply a society of Englishmen, of the age of Shakespeare, taken out of England and set down in Virginia."

There was a steady extension of the settlements and a regular growth of the wealth and condition of the planters going on without interruption through the remaining three-quarters of the century, and with these better fortunes of the colony came, of course, great improvement in the architecture of the young country. An inordinate passion for land-owning seems to have early possessed them, and enormous tracts of country were granted to the more distinguished settlers.

The population of Virginia in 1715 was about 95,000, of whom 23,000 were negroes. Of other servants there were many persons of humble degree who worked for hire upon the plantations, besides the "kids" — a possible derivation from kidnap — who were apprenticed for terms of five years, and finally a small percentage of convicted felons who had been forced upon the colony by the government from time to time, and who were farmed out to the planters at low rates.

At the seats of the aristocratic great planters were always large retinues of slaves and indentured servants, and life at these places had developed, at the beginning of the eighteenth century, into an affair of much luxury and lavish expenditure.

Very few of the handsomest of the colonial manor-houses antedate this time. The rage for building costly houses lasted up to the first years of the Revolution. But the stress of that long, hard struggle gave the people other matters to think of, and a decadence in the architecture of Virginia set in about that period.

[1] Continued from No. 712, page 73.

Thomas Jefferson, writing his "Notes" in 1781, has something to say about the rude huts of the poorer classes, built in pens and with the crevices between the logs roughly smeared up with plaster. He adds that board houses were erected nearly everywhere in preference to buildings of brick or stone, a false idea prevailing that the latter were damp and admitted rain through the walls.

He goes on to disprove this to his own satisfaction, and deplores the exclusive use of wood in building, which precludes all hope of improvement in the architecture of the country, both because of the necessarily temporary character and short life of these wooden houses and the inadaptability of the material to elegance and dignity of design.

The first three-quarters of the eighteenth century, then, were unquestionably the golden age of Virginia in the matter of architecture, and perhaps in other respects besides. The manorial country-seats of that day were always built upon the river shores, and each place had its long wharf extending out into the water deep enough for the light-draught English vessels which lay at their ends unloading London commodities, and taking on tobacco for England.

Carter Burwell's famous house stands upon an eminence about seventy-five feet higher than the river. Three broad terraces break the descent to the level fields lying along the river shore. The view from the house, across the meadows and over the glistening river widening out below into Burwell's Bay, is very fine.

Away upstream to the westward one is shown where Jamestown stood in the olden time. Enormously costly must have been the building of such a house as this one in a country so destitute of proper material and workmanship as was the Virginia of its day. It would be very interesting to know something about the making of the plan of the house, the arrangement and details of which have evidently received such careful study. It is singular that the names of the architects of these aristocratic mansions should be nowhere discoverable, and yet, of course, the titles of the owners and occupants are always so intimately associated with a house that others connected with its construction may very easily be forgotten. Doubtless, whatever plans there may have been were made in England, the colony hardly affording at that stage of her existence a very promising field for architectural immigrants. The English manor-house of the period was the invariable model. The division of space was extremely simple. The finishing of the interior, the arrangement of the handsome wainscotings, the mouldings of the architraves, chair-boards, bases, friezes and cornices, and the work upon the great rich stairways, all evince careful study and an educated taste.

Nearly everything was brought over from England, it would seem, and the cost of transportation alone must have been considerable.

It is to be presumed that there were enough competent workmen in Virginia to put things together when they arrived on this side. Nevertheless, it must all have cost a pretty figure, and no doubt these lordly planters paid in princely fashion for their magnificence.

Mann Page seems to have well-nigh ruined himself in the building of his great manor-house of Rosewell, and we find his son petitioning the Burgesses for authority to sell enormous tracts of the Page domain in order to pay the debts of his father, both in England and the colony, he having found it beyond his power to liquidate them from the proceeds of the estates.

These lands included eight thousand acres in the estate of Pageland in Frederick County, ten thousand acres in Prince William, four thousand five hundred in Spottsylvania, one thousand in King William, two thousand in Hanover, two thousand in James City, besides lands in Essex, Gloucester and elsewhere, not enumerated.

Bishop Meade, in his "*Old Churches and Families of Virginia*," says: "Now it cannot be doubted that the tradition is correct that much if not all of the original debt was contracted for the erection of this immense pile of building, every brick of which, and doubtless much other material, together with the workmen, were imported from England and not paid for, except by his agents and friends there, until the sale of these lands in Virginia enabled the son, long after, to do it. The whole of the roof of this ancient building was covered with heavy lead over the shingles. The result of this immense expenditure was not only the entailing a heavy debt upon his estate, and the causing a sale of lands which might have furnished his posterity for some generations with farms, but the keeping up such an establishment has been a burden on all who have possessed it to the present day, as must be the case with all such establishments.

"For a long time old Rosewell has been standing on Carter's Creek, in sight of York River, like an old deserted English castle, in solitary grandeur, scarce a tree or shrub around it to vary or beautify the scene. No one of the name of him who built it has owned it or could afford to own it for generations. Some stranger fills the Stuart's throne. *Sic transit gloria mundi.*" But the worthy bishop does not take into account the very great outlay necessary to working or even merely owning such a principality as the Pages governed.

"The Acts of Assembly give us other instances in old Virginia. Mr. Lewis Burwell, of King's Mill, near Williamsburg, built a house worthy of his first-born son, to live in; and that first-born son, after his father's death, was obliged to petition the legislature for leave to break the entail and sell a large tract of land in King William to pay for it."

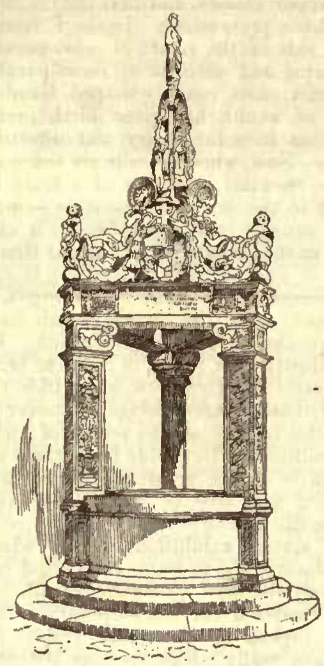
The laws of primogeniture and entail were even more rigidly enforced in Virginia than in the mother-country, and estates were handed down for generations in the line of the eldest son.

The Lewis Burwell of King's Mill, whom the old bishop cites in his disapproval of the luxurious and expensive elegance of the colonial houses, was the son of Major Lewis Burwell and Elizabeth, daughter of the great Robert Carter, of Corotoman, and a brother of Carter Burwell who built the manor-house of Carter's Grove, which we have just described, in the year 1737. The wife of the latter gentleman was Lucy Grymes, whose sister married Mann Page, both ladies being the daughters of the Honorable John Grymes.

A son of Carter Burwell, of the Grove, was Colonel Nathaniel Burwell, of Carter Hall in Frederick County. A. B. Bibb.

[To be continued.]

INDUSTRIAL ART.



Fountain at Mayence.

M. MELANI ALFREDO, Professor at the Superior School of Art, at Mantua, has just published through Ulrico Hoepli, of Milan, two interesting volumes on decoration and the artistic industries. The historical side of this work is extremely attractive, for the author, with concise learning, recapitulates the story of the rôle played by decorative art in Egypt, Assyria and Phœnicia in the first place; then in succession in Greece, Etruria, Rome, Pompeii; in Arab and Byzantine society, and in the Romanesque world; then, finally, in Lombardy in the first place, and next in all Italy during the Renaissance, as well as in France before and after the Decadence. The reading of these two volumes is not only useful, but indispensable for all who wish to understand thoroughly this branch of art, of which they contain the substance. In the main, industrial art is fatally summoned to enlarge its dominion, to issue from its narrow limits in which it has been confined up to the present time, and to become, in a word, a real art, in place of being a kind of counterfeit art, as it has been considered until to-day.

It is certain that if the State has not the power to awaken at its desire an artistic impulse in the people and beget *chefs-d'œuvre*, the political organization of a country is called on to exercise a direct influence on the direction which the intellectual activity of the people takes in things which afford pleasure to the beholder. When municipal life absorbs all the popular faculties, as in Italy before the Renaissance, the individual thinks only for the people as a whole. The citizen dreams only of what he can contribute to the glory or the lustre of a city, and he sacrifices, if he must, his personal well-being to that civic pride which for him is a duty. At that time art busied itself in building and ornamenting public monuments; at that time were seen rising everywhere, cathedrals, public palaces, establishments of common usefulness, which were embellished without haggling, because they were considered the common property of all. To-day the function of the State, the rule of the municipality, have been radically modified. The citizen pays to the power an agreed ransom for the assurance of his own security, after which he thinks only of his own well-being. The development of individualism has materalized the functions of the public powers who have not, with the masses, other points of solidarity than those which unite the salaried *gendarmes* to those whom he protects. When one has given to a *gendarme* a good sabre and fine carabine, he needs no more of him, but is free to think only of his home. Every one loves to have fair places and fine promenades; but, above all, one loves to have in his own home the greatest possible amount of comfort. In place of concentrating effort on some public monument, artistic luxury tends to scatter itself about the hearth or in works of household usefulness. The era of decorative art has dawned, consequently the work of M. Melani, as well as of all those who treat this subject, come quite apropos.

For my part, I find that this industrialization of art towards which we are tending must be faced with some mistrust. I do not in any way share the delusion of those who believe that there will result from it a new age of gold. Art is, in its essence, aristocratic, and in popularizing itself, in becoming democratic, in being applied to ordinary and vulgar objects, it will lose in intensity that which it will gain in expansion. It is good, surely, that utensils and furniture should offer as elegant a physiognomy as possible, and should join agreeableness of aspect to their utilitarian use. We know now that with the ancients, the Greeks, the Etruscans, the Romans, to speak only of these, this step was partly realized. Pottery, glass, all minor objects of the toilet and of the *cuisine* were made with a taste

full of distinction. Glass, even, had reached a degree of perfection which we have not suspected, for we for a long time believed that the ancients were ignorant of the art of casting glass, or that they practised it only with clumsiness. I have seen, on the contrary, at certain museums at Orvieto and Corneto, phials of polychromatic glass and moulded pots which proved that even amongst the Etruscans they knew the secret of working glass as finely and with as much elegance as to-day at Murano. Industrial art was also applied to articles of commerce. Who has not been stricken with astonishment and admiration before the weights and bells and keys and hammers and richly-ornamented door-knockers that have been found at Pompeii?

But the new industrialization of art towards which we are progressing will affect, if we do not take care, a fatally trivial character, because times are no longer the same. There is reason for supposing that at Rome, and amongst the Etruscans, industrial decoration was destined exclusively for the upper classes, and that the common people used objects devoid of æsthetic pretensions. In the Etruscan necropoles are discovered, by the side of the tombs of great personages which contain amphoras, arms and utensils of incomparable richness — pits whence they extract vases roughly shaped, formless and ugly. To-day the diffusion of wealth has given birth pretty much everywhere to a taste or an ambition for luxury, and industrial art will be *bourgeois* or it will not. Now, whoever calls art *bourgeois* declares a negation of art. The essential condition of a truly industrial art is that it must submit to the law of competition — must run the chances of commercial struggle, and must finish, in consequence, by being cheap, which, in the domain of art, means that it must be common.

M. Melani, by implication, confesses this, without suspecting it, in the pages where he deplores and seeks the causes which have hindered up to now the development of artistic decoration. He recognizes that every object of industrial art ought, in order to bring about its vulgarization, to be a matter of current use and within the reach of every one's purse. Now these common things will never be the chased cups of Cellini nor the faience of the school of Della Robbia which unite these two conditions. But aside from these exceptions, the work of M. Melani is of the greatest interest, and ought to be consulted by all those who love to make themselves familiar with the subject which he discusses.

We have had lately at Rome several exhibitions, two of which were devoted to painting and sculpture, one to water-colors and one to ceramics, which last was certainly the most interesting of all.

The best service which can be rendered the contemporary artists of Italy is to ignore their work. I speak of those who exhibit; for the self-made men, those who have really talent, such as Michetti, Corcano, Ferrari, Monteverde, shun exhibitions where their works run the risk of being found mixed with sketches whose neighborhood is anything but flattering.

The juries of admission are inexplicably indulgent. According to their ideas it is enough to smear a canvas with colors, or to ferociously scratch against a morsel of marble to have succeeded in making a painting or a statue. It results from this that the Italian exhibitions offer us a disconsolate picture of the sad decadence into which the art of this country has fallen, which once knew such glorious days — a country which once showed the road to every other people, who, since the Renaissance, have excelled in their turn in the cultivation of the beau ideal. What are the causes by which artistic genius seems condemned to a doleful sterility under a radiant and fecund sky, which formerly lighted the fairest flowering of art which humanity has ever known? The problem is one of the most complex, and deserves to be investigated by the critic; but I do not allow myself to be tempted by the variety and breadth of the subject, since it would force me to greatly exceed my allotted space.

I prefer to say some words concerning the ceramic exhibition at the Palace of the Fine Arts, which drew together a crowd of artists and *dilettanti*.

The Italian collections are interesting and precious, not only because, after the barbarism which followed the fall of the Roman Empire, they are the works of Umbria, Marches and Sicily, which kept in honor the art of decorating faience, but also because it was Italy which saved from destruction the most remarkable remnants of Mooresque ceramic work brought from Spain before the expulsion of the Arabs. Thus it is that we can find here models of platters, vases and statuettes made in the potteries of Valencia, Manises and Majorca. It is doubtless through a corruption of this last word that in Italy the name of Majolica was given to elaborate pottery. It is beyond doubt the Spanish Arabs who introduced into Sicily the art of decorating pottery, and we know of vases with a glazing of metallic lustre, which issue from the workshops of Palermo, Trapani and Caltagirone, which perfectly resemble those preserved in the Alhambra. Besides, before the introduction of the Moorish style, there had been tried spontaneously in Italy several methods of refining pottery and dishes. In the museum at Frioli and Cividale there is preserved a varnished platter with Lombard inscriptions. To-day it is no longer disputed that the faience plaques which sparkle upon certain Italian monuments of the tenth and eleventh centuries, for example, were made on the peninsula, in place of being Spanish faience, added by the architects to the monuments of that epoch to enhance their beauty by polychromatic adornment.

Finally, in the first half of the fifteenth century, Lucca della Robbia brought ceramics to the level of an art of the first order, and raised it to such a degree of distinction that the productions could be placed side by side with the sculptures of Donatello in the decoration of the grandest religious monument at Florence. After the vigorous impulse given to this art by Della Robbia, the works of Umbria, of Marches, of Romagna, and especially those of Gubbio and Faenza, reached the apogee of their fame, and the specimens which remain to us prove that designers of exceptional value and distinguished specialists lavished all the resources of their talent to nourish and increase the fame of the product.

To-day Italy only possesses workmen who cling to imitating the ancients; and the models of modern industry which have figured at this exhibition bear testimony to an absolute decadence, if we except some Venetian curiosities, or the porcelain collection of Ginori, which, nevertheless, are far from being possible of comparison, even superficially, with Sèvres or Saxon ware.

One could also see in certain sections of this exhibition a very varied collection of Etruscan, Roman and Greek specimens. There were even three statuettes, which were called "Tanagra Statuettes," which were found in the tombs of Bœotia, which, in spite of the reputation for foolishness which the Athenian poets made for it, gave birth to Plutarch, Pindar and Corinna. One of the statuettes, belonging to Prince Odeschalchi, is a marvel of grace. It is a seated Venus, which, in itself, attests the extreme ability of the Bœotian artists.

In short, in passing through the halls of the Palace of the Fine Arts, one could take exact account of the history of ceramics of all the principal epochs in all the countries which have excelled in this art. There were, indeed, here and there, some gaps, but the collection, as a whole, presented a sufficiently complete view, with which the *savants* and artists could only show themselves well pleased.

H. MEREU.

SALT WATER FOR BIG TOWNS.



"AN enormous saving in water would be effected if sea-water were used in all cases where fresh water is not absolutely indispensable, and especially for such purposes as the flushing of sewers and the watering of streets. The advantages to be derived from sea-water for such municipal purposes as the above have frequently struck engineers, and are set forth in a paper read by Mr. S. H. Terry before the Civil and Mechanical Engineers' Society. There have not been wanting schemes for supplying sea-water even to inland towns, but hitherto it has been objected that sea-water, though so abundant, was an expensive commodity to supply to towns, and it has even been asserted that the effect of sea-water on the pavements, for instance, was anything but beneficial. These ideas, however, have now been exploded.

A gallon of sea-water contains about 2,500 grains of saline matter, of which about 1,890 grains are common salt — chloride of sodium — the remaining 610 grains being composed of other salts; and it is due to the deliquescent character of one of these salts, chloride of magnesium, that any material having once been moistened by sea-water remains moist for a considerable period. But, after storms, there is also present in sea-water taken from near the shore, in the vicinity of weed-covered rocks, a considerable amount of organic matter from the destruction of seaweed, and the consequent mixture of its glutinous sap with the water. It is believed that it is to this glutinous material that the formation and endurance of the bubbles of sea-scum, which occasionally, in gales, are driven some distance inland, is due. As, roughly speaking, about 80 pounds' weight of various salts are present in every water-cart containing 224 gallons — one ton — of sea-water, it will be seen that much material, which may or may not be injurious, is, in the course of a few weeks, spread over the streets of a town by the water-cart. This fact had created a feeling that the use of sea-water for streets might not be without its dangers, and Mr. E. Buckham, M. Inst. C. E., Borough Engineer of Ipswich, was so much impressed with it that he instituted inquiries on the subject, and requested information from the engineers of thirty-five coast towns who had used sea-water for watering the streets. Twenty-three of the engineers written to replied that they were no longer using sea-water, as they had no works for that purpose; twelve stated that they were using sea-water, some with suitable works, and some by merely filling the carts by hand; and two that they were about to have works.

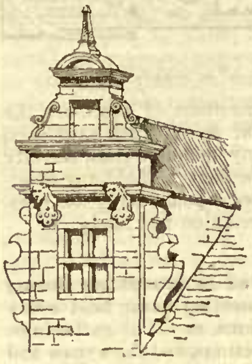
The engineers of two towns, Ramsgate and Folkestone, spoke adversely of sea-water, and stated that it destroyed all kinds of road material except wood. Some advised its use for sewer-flushing, if a sufficient volume was employed; others, again, were of opinion that sea-water tended to produce gas when brought into contact with sewage, and should not be used for sewer-flushing except in large volumes. But it is probable that sea-water only produces objectionable effects in sewers when these are particularly foul, and the influx of sea-water stirs up the decomposing matter deposited in them. With regard to the efficiency of sea-water as a means of preventing dust on roads formed of flint, gravel or granite, the testimony of those who have used it is almost entirely in its favor. Indeed, the borough engineer of Berwick-on-Tweed goes so far as to say that all persons having control of street-watering should use sea-water, where it can be had, for reasons of economy, as well as for the comfort of the inhabitants. In his district he finds that one cart of sea-water is equal to two carts of fresh water, and gives more lasting and beneficial results. He states that the macadamized roads that are watered with salt water are a pleasure to drive upon in the summer season, as compared with those watered with fresh water, and they never seem to have a loose stone upon them.

In answer to Mr. Buckham's question, whether sea-water occasions any offensive decay of street refuse, and if so, whether this is greater than that which would be occasioned by rain or fresh-water, the pithy reply was: "No, when the scavenging of the towns is regularly attended to." Without enumerating all the favorable answers that were received, it will suffice to state that the following important seaside resorts reported in favor of sea-water: Portsmouth, Tynemouth, Great Grimsby, Great Yarmouth, Hastings and Littlehampton. Hastings, which has a population of 42,258, and a rateable value of £309,219, has erected very extensive works at the cost of £9,000 for sea-watering, which means a charge of about 3*d.* per head of the population, or ½*d.* on the rateable value. Great Yarmouth, with a population of 46,159, and a rateable value of £133,658, has completed works of salt-water supply for street-watering at a cost of £4,500. Here an 8-horse power Otto Crossley gas-engine has been erected, with a 12-inch pump, engine-house, tower and tank, containing 22,000 gallons, settling-tank and suction-pipe, fixed to the jetty. There are about 9,000 yards of main, ranging from 8 feet to 3 inches cast-iron socketted-pipes, lead-jointed, 40 stand-posts, 12 automatic flushing-syphons — Field's — each connected to tanks holding 2,000 gallons of sewer-flushing.

The total expenses, including interest and capital, repayment of loan in 20 years, depreciation of wages, gas, oil, etc., are under £500 per annum. For this amount some 30,000,000 gallons are raised 44 feet at a cost of 4*d.* per 1,000 gallons. Of this volume about 5,000,000 gallons are used for street-watering and 25,000,000 gallons for sewer-flushing. Before these works were constructed the cost of water for street-watering alone was £404 on an average of each 7 years, ending 1883. In 1885 it was as much as £552. To keep the automatic tanks of the size mentioned properly going the cost would have been £700 per annum. The charge for water at Yarmouth was, at that time, 1*s.* per 1,000 gallons. The cost of watering for street-watering and sewer-flushing, including all items mentioned above, is less than 3*d.* per head per annum, and something under 1*d.* in the pound. At Gosport a similar experiment has been made, with highly satisfactory results. The facts speak eloquently for themselves, and require no further comment. In some cases, however, the water-companies offer a very strenuous opposition to the introduction of sea-water, and Mr. Terry instances the case of Kirkhallerton, near Redcar, on the Yorkshire coast, where a very neat scheme was got out for the supply of sea-water for street-watering, and it was also intended to supply sea-water for bathers to the houses, and but for this intention the scheme would probably have been carried. The law here stepped in, and showed that inasmuch as the district was within the limits of supply of the Stockton and Middlesbrough Water-Works, a loan for such works of proposed supply would be illegal.

The discussion which followed Mr. Terry's paper was nearly all in favor of sea-water. Its employment for the watering of streets, at any rate, is a perfectly practicable idea, and one that can be adopted with economy and success. The increasing size of our towns makes adequate supply of water annually a question of greater and greater difficulty, especially when we remember that with the spread of the scientific spirit of the age cleanliness may be said to be advancing at quite an alarming ratio, and that the demands made on our water-supply for municipal purposes are growing almost daily. In London, this is felt very appreciably, and it would be interesting to see an experiment tried on a large scale of flushing our enormous sewers, and watering our interminable streets with sea-water. For this purpose London is more favorably situated than any other capital in Europe almost. Constantinople and Lisbon perhaps alone excepted. At any rate, there is a strong feeling that something must be done, and that speedily; and Mr. Terry's paper may, therefore, be received as containing what, at least, appears to be a very practical suggestion, and possessing, moreover, the merit of being, as far as we know, the first attempt to bring together in an accessible form all the *pros* and *cons*, and experience and practice connected with the subject. The moderate cost of the pipes necessary for supplying even a large town places the proposal very easily within the reach of realization. — *Engineering.*

REPORT OF THE COMMISSIONERS FOR THE EXHIBITION OF 1851.



THE Commissioners have just issued their seventh report, which brings the account of their proceedings down to the present time. The number of institutions now standing on the estate of the Commissioners is as follows:

1. The South Kensington Museum, the School of Science, and the Department of Science and Art.
2. The Natural History Museum.
3. The India Museum.
4. The Patent Museum.
5. The Museum of Scientific Instruments.
6. The Royal Albert Hall.
7. The Central Technical Institution.
8. The Royal College of Music.
9. The Imperial Institute.
10. The Royal School of Art-Needlework.
11. The Alexandra Home for Female Students.
12. The Museum of the Fish Culture.
13. The Anthropological Laboratory.
14. The School of Art Wood-carving.
15. The Home Arts and Industries Association.
16. The School of Cookery (*now removing*).

The Commissioners give the following account of the amount of their contributions to public purposes:

"In our last report we mentioned that the result of the Exhibition of 1851 left us in possession of a sum of £186,000, and we showed that the continual increase in the value of our estate had already enabled us to contribute to public purposes money and property amounting to nearly half a million. We have since the date of that report allotted, as above reported, for the Central Technical Institution, a site valued at £40,000; to the Alexandra Homes a site valued at £10,000; to the Royal College of Music a site valued at £45,000; and to the Imperial Institute a site the value of which cannot be estimated at less than £250,000. In addition to these grants of land, we have by our annual subscription of £500 a year to the Royal College of Music, provided a sum of £3,000 for musical education."

The conclusions of the report are thus summarised.

"We have mentioned the non-acceptance by her Majesty's Government of our offer to provide a building for a Museum of Science, and the steps which we have subsequently taken in the hope of inducing the Government to establish on our estate those institutions ancillary to the teaching of science which are necessary to form a complete system of scientific education for this metropolis. We have referred to the circumstances which compelled us to put an end to the connection between the Royal Horticultural Society and our estate, and have narrated the steps taken to recover possession of the gardens from the society, and the uses to which that portion of the estate has been subsequently put. We have given detailed accounts of the establishment on our estate, since our last report, of the Central Technical Institution, the Royal College of Music, the Alexandra Homes, and the Imperial Institute, and have also explained the relations which have existed between us and the various bodies accommodated on our estate. We have reported the various other dealings with the estate since the date of our last report, and have submitted statement showing our financial position. We have also submitted our proposals for the future, which are in effect the raising of a considerable free income by alloting for private building purposes part of the northern portion of the central quadrangle of our estate, while reserving in our hands sufficient space for the development of the Science and Art Department, and the foundation, from part of the surplus income thus obtained, of scholarships for the purpose of assisting provincial technical institutions of science and art, and connecting them, if they desire it, with the larger schools and colleges which exist in the metropolis.

"The experience of recent years has convinced us that a substantial disposable income will enable us to work more usefully in this and other directions for the public benefit than would the mere ownership of unproductive land. While we have always kept in view the original objects of our trust, the remarkable increase in the value of the estate which was secured to us by the wise forethought of his Royal Highness the Prince Consort, our first president, has enabled us to give a wider scope to our work than could have been anticipated from the amount of the fund which the success of the Exhibition of 1851 placed in our hands. The profits of that Exhibition were derived from national and not simply metropolitan co-operation, and we believe that we carry out the wishes of its royal founder when we propose to realize part of our property for national purposes." — *Journal of the Science of Arts.*

The Longitudinal Expansion of Wood. — After immersion in water for thirty-seven days, specimens of pine were found by Prof. D. V. Wood to have been lengthened 0.065 per cent, oak 0.085 per cent, and chestnut 0.165 per cent, the lateral swelling being 2.6 per cent for pine, 3.5 per cent for oak, and 3.65 per cent for chestnut. — *Worcester Gazette.*

SOCIETIES

BOSTON ARCHITECTURAL CLUB. — ANNOUNCEMENT.

THE Directory has announced to the members of the Club the plans for the coming year's work, so far as any such have been decided upon. The absence of so many members from the city during the summer has made it seem inexpedient to hold any meetings at all, but the Club work will be entered upon during the present month, and opportunities afforded for re-union and study.

CONVERSAZIONI.

The informal conversazioni which proved so interesting during the past year are to be renewed, one such meeting being held every week, devoted to informal lectures, discussions, or social gatherings. Several parties have volunteered to lead meetings, and the names and topics will be announced subsequently. It is intended to mingle with the purely architectural topics some consideration of the practical details of the profession, such as steam-heating, superintendence, iron-work, and the like, as it is believed that many of the members will be profited by the study of such themes.

LECTURES.

Professor Ware has kindly loaned to the Club his entire magnificent collection of lantern slides, amounting to, in all, over 700. Mr. C. Howard Walker has consented to deliver a series of informal talks upon the History of Architecture, illustrated by these lantern slides. There will be one such lecture on the first Wednesday of each month, beginning with October and extending to April.

Besides these, several of the best known authorities on art and architecture have been informally spoken to, and it is hoped that arrangements can be made by which a series of public lectures can be given under the auspices of The Boston Architectural Club.

There are several other lecture features which it is intended to develop during the winter, but which are not sufficiently elaborated for public notice.

EXHIBITIONS.

As in the previous year, it is intended to hold an exhibition of some sort every month, and six of these are already partially provided for, and will be announced later.

It was thought best last year not to attempt any general exhibition of architectural drawings. Arrangements are already in progress for an annual exhibition to be held by the Club early next May.

CLASSES.

It is intended to establish, the coming year, one or two Life and Water-Color Classes, the instructors for which have not as yet been decided upon; a Pen-and-Ink Class under the direction of Mr. Gregg, and a Sketch Class, the direction of which will be left to the members.

As has already been informally announced it is the intention to establish special classes for the benefit of those members of the Club who are intending to compete for the Rotch Travelling-scholarship. Instruction will be given in Design and Planning, on the system followed in the Ecole des Beaux-Arts. Also in the History of Architecture, Construction, Perspective, Cast Drawing, and Modelling.

If possible, an arrangement will be made by which members of the Club who desire instruction in French or German can obtain such at reduced prices.

The Directory is looking forward to a very satisfactory year. The Club is entirely free from debt, has an active membership of over 150, and there is no reason why it should not make, this year, a name for itself.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A CORRECTION.

SAN FRANCISCO, CAL., August 31, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The Presbyterian Church at Liberty, Mo., was built from the plans of W. W. Polk & Son, of Kansas City, and not, as you were led to believe by me, possibly from the fact that the drawing that you published bore my signature as the delineator. A sketch plan of the church having the firm name upon it was intended for publication, but was lost, and I was unable to reproduce it, owing to the change of my location. I ask this correction in justice to my father.

Very truly yours, WILLIS POLK.

CONTINUOUS BEAMS.

ANNAPOLIS, MD., September 1, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In the case of three parallel walls, making two spans of say 15′ each, would you advise the use of continuous rolled-iron beams, or is it better to have the beams independent for each span? I should think an answer to this query would interest many readers of the *American Architect*. Yours truly, H. DALMON.

[CONTINUOUS beams would be both stronger and stiffer, but they might cost more than independent beams of the same dimensions. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

SAWING STONE BY HELICOIDAL WIRE-CORD. — In place of the ordinary method of sawing stone, a new plan of cutting by means of wire-cord has been adopted. While retaining sand as the cutting agent, M. Paulin Gay, of Marseilles, has succeeded in applying it by mechanical means, and as continuously as the sand-blast and band-saw, with both of which appliances his system — that of the "helicoidal wire-cord" — has considerable analogy. An engine puts in motion a continuous wire cord (varying from 5-32 to 7-32 of an inch in diameter, according to the work), composed of three mild-steel wires twisted at a certain pitch, that found to give the best result in practice, at a speed of 15 to 17 feet per second, the higher speed being adopted for the smaller diameter. Instead of the stone being brought to the saw, the wire-cord, which may be of indefinite length, is led to the stone, being guided by grooved pulleys, mounted on bearings with universal joint, which permits of their adapting themselves to any change of direction. The same cord, which is kept at uniform tension by a weighted truck on an inclined plane, may act upon any number of blocks, provided sufficient space be given between them to allow for cooling. The pulleys are mounted in standards, and are fed down by endless screws rotated automatically if the stone be uniform, but preferably by hand if there is reason to suspect irregularities in its texture. Sand and water is allowed to flow freely into the cuts, the sand carried along by the cord in the spiral interstices between the wires causing a uniform attrition of the stone. The twist of the cord causes it, while travelling, to turn upon itself, and thus become worn evenly. A cord of average length, say 150 yards, will cut about 70 feet deep in blocks 15 feet long, or produce 490 square feet of sawn surface before being worn out, when it may be used for fencing. The sand must be sharp, and not used more than three times. The nature of the sand is determined by the hardness of the stone; thus, quartz sand will cut granite and porphyry, which it has hitherto been found impossible to saw, or indeed cut in any other way than by pick or chisel. An hourly advance of 1 inch in granite or porphyry, and 4 inches in marble, is regularly obtained in blocks of 15 or 16 feet long. At the Brussels Exhibition of last year, where the system was awarded a First Prize of Progress, the same cord which cut marble also cut a block of concrete composed of quartz pebbles. Not merely does the helicoidal cord saw blocks of stone, but it even cuts them out of solid rock in the quarry. To do this it is necessary to sink shafts of 2 feet or 2 feet 6 inches in diameter, in order to introduce the pulley carriers. If there is a free side to start from, one shaft is sufficient for a triangular block; but for a quadrangular one, which is preferable, two shafts are necessary. They are bored by a mechanical perforator, consisting of a hollow plate-iron cylinder, having at its lower end a slightly thicker collar which acts with sand and water in its latest development. The cylinder is made to revolve at a speed of 140 revolutions a minute, by means of a tele-dynamic cable, advancing about an inch per hour in marble. An annular space is cut in the rock, leaving a core, which may be utilized as a column. The diameter of the shaftway depends upon the diameter of columns most in demand, provided a sufficient number be sunk, and the intervening angles broken down, so as to afford sufficient room for the pulley carrier. In the case of stratified rocks, the shaft-cuts are carried down to a natural parting; but in unstratified rocks a nearly horizontal cut may be made with the cord, sufficient inclination being given to insure the flow of sand and water to the bottom of the cut. Such is the method of working practised at the Traigneaux Quarry, near Phillippeville, in Belgium, where 15,000 cubic feet of marble are extracted yearly with 30 horse-power engine, and only 30 hands in summer and 20 in winter, besides the lads who tend the wire-cords. The system is also employed at granite and marble quarries in France, Germany, Spain, Italy, Algeria, Tunis, and other countries, where it is said to be giving satisfactory and economical results. — *Journal of the Society of Arts.*

STEALING JULIET'S TOMB. — Of the strange fortunes that may come to men of great name after death, many authors have written. Sir Thomas Browne tells us that "the Egyptian mummies, which Cambyses or time hath spared, avarice now consumeth. Mummy is become merchandise, Mizraim cures wounds, and Pharaoh is sold for balsams." That may account for the disappearance of a dead body, but some other feeling must actuate those who carry away part of a tomb. One of the choicest attractions of Verona for strangers, especially for those who know the works of Shakespeare, is the so-called tomb of Juliet in the garden of the Franciscan nuns, in the vicinity of the swift-flowing Adige. A large portion — no less than six pounds' weight — of this tomb was broken off, and was almost carried away by a person described as an Englishman. The story, as told in the Verona papers, relates that an English lady and gentleman went to visit the tomb of Juliet and Romeo three or four days ago. Before leaving the spot the Englishman handed a note of 10f. to the custodian of the place, in order that the ordinary fee might be deducted and the change handed to the visitor. While the custodian searched in his pockets for change the tourist produced a hammer from his pocket, and by a sharp blow on

the rude sarcophagus of red Verona marble, which is said to have enshrined Juliet, broke off a piece of about three kilogrammes, or six pounds in weight. Then he moved away rapidly from the scene of destruction and desecration. The custodian, who had observed the deed, pursued him and suggested the propriety of his giving up the plunder. The Englishman protested, and it was only after a lengthened debate that the visitor finally delivered up the fragment broken off the Juliet sarcophagus. Such is the story now going the round of the papers. In Gustave Doré's illustrations to "*L'Espagne*" of Baron Davillier there is an illustration entitled "The robbers of *azulejos* (tiles) at the Alhambra," representing an Englishman of the Continental type, accompanied by his wife, and engaged in hammering off the colored tiles from the walls of that incomparable building. This is the idea that many French and Spanish and Italian people have of the Englishman abroad. The report of the attempt to carry off three kilogrammes of Juliet's tomb will confirm the old idea. It matters but little that no one who knows the history of the place regards the tomb as genuine: for the people of Verona it is at least as effective in inducing strangers to visit their city as if it were the indisputable sepulchre of the unfortunate daughter of the Capulets. Murray notes that "it certainly was shown in the last century, before Shakespeare became generally known to the Italians. . . . Maria Louisa got a bit of it, which she caused to be divided into hearts and gems, elegant necklaces, bracelets, etc., and many other sentimental young and elderly ladies have followed her Majesty's example." It is all very well for a royal personage, such as Maria Louisa, to get a bit of this troughlike tomb; but an unknown English traveller who attempts to carry off six pounds of red marble in a surreptitious manner, even for the gratification of sentiment, is treated with scorn by the journalists of the whole country, and deservedly so. — *Glasgow Herald*.

Fibre *vs.* Hair in Mortar. — Various tests have been made with a view to ascertaining the advantage to be derived from the use of manilla fibre, as compared with other substances, in plastering work. One of the most conclusive of these tests was made with four plates of equal size, one containing manilla hemp, a second sisal hemp, a third jute, and a fourth goat's hair of the finest quality, and the operation consisted in suspending weights from the middle of each plate, the ends of which were properly supported. The result showed that the plaster mixed with goat's hair broke at 144 1-2 pounds weight, the jute at 145 pounds, the sisal at 150, and the manilla at 195 — in the latter case the hemp not breaking, but cracking, and, though cracked in the centre, the lower half of this plate, when it was suspended, held on to the upper half, the manilla securing it fast. The three other plates were broken — that is, the two parts of each plate had severed entirely, in contrast with the manilla plastering. Another experiment consisted in mixing two barrelfuls of mortar, each containing equal portions by measure of sharp sand and Thomaston lime, one of the barrels, however, being mixed with the proper quantity, by measure, of manilla hemp, cut in lengths of one and a half to two inches, and the other of best goat's hair. On being thoroughly mixed with the usual quantity of water, the respective mixtures were put in the barrels and stored away in a dry cellar, remaining unopened for nine months, when, on examination, the hair mortar crumbled and broke apart, very little of the hair being visible, showing that it had been consumed by the lime; but the other, containing the hemp, showed great cohesion, it being quite an effort to pull it apart, the hemp fibres permeating the mass, and showing little or no evidence of any injury done to it by the lime. — *Providence Journal*.

The Camera a Witness in a Suit for Damages. — A civil engineer in charge of important work nowadays must be something of a diplomat and lawyer, as well as a master of his own calling, and must, to use a cant phrase have eyes in the back of his head. As the Denver *Republican* recently said, a good engineer can save his salary ten times over. One instance showing the forethought required, may be cited from the work upon the London Southwark subway or tunnel under the Thames. This work is three miles long and has been in progress for three years. Recently, after the tunnel had passed, some householders in buildings overhead discovered cracks in their walls, for which they promptly demanded damages. When the case came to be heard, the engineer produced photographs of the walls in question taken before the tunnel workings reached them, and showed that the cracks complained of were old ones. It seemed that the engineer, as a measure of precaution, had carefully photographed every wall and building likely to be affected by the excavations for the tunnel. — *Mechanical News*.

Slate an Unsafe Roofing for Mills. — A writer in the *Milling World* says: "Slate is not a safe material for mill roofs. Not long ago, I saw a slate-roofed mill fired by heat from an adjoining burning building. The heat cracked the slates and they ran off the roof in a shower, leaving dry wood exposed to the flames. Another building covered with shingles was equally exposed, and singularly enough the roof of the slate-covered mill took fire before the roof of the shingle-covered building. The streams of water turned on the slates after they became hot caused their rapid destruction, while the wetted shingles were kept from burning. The slate roof allowed streams of water to drip downward through the entire building, while the shingle roof protected the building which it covered. Slate roofs may prevent fires from floating sparks, and shingle roofs when very dry may invite fires from such sparks; but where buildings are crowded closely together almost any one of the roofing materials is better and safer than slate, because in the case of crowded buildings the slate is exposed to heat sufficient to break it and uncover the wood."

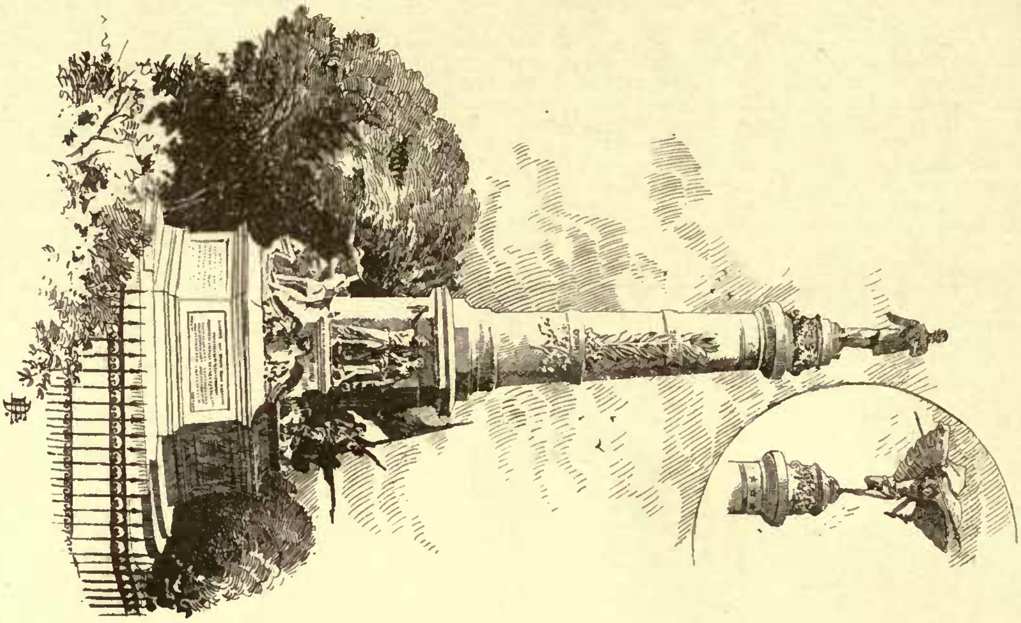
The North River Tunnel. — Work has just been resumed on the submarine tunnel to connect New York with Jersey City. The tunnel will extend from the foot of Morton Street on the New York side to a point between the Delaware, Lackawanna & Western and the Erie Railway's termini on the New Jersey shore, and it is hoped to have it completed within three years. The system will consist of two independent tunnels, known as the north and south tunnels. The actual length of each tunnel will be 5,600 feet. In addition to this there will be an approach of three-fourths of a mile on each side, making a total length of over two and a half miles for each tunnel. The approaches to both tunnels will consist of a single large arch. Some preliminary work upon the tunnel was done in 1873 In 1879 work was resumed, and a shaft sunk. The operations stopped in 1882. Then the work on the New Jersey end of the north tunnel was completed for 1,500 feet, and on the south tunnel for 560 feet. On the New York side there were seventy-five feet completed on the north tunnel, and none on the south tunnel. Two years ago 305 feet were added on the New Jersey side of the north tunnel. This, with some other slight additions, made a total of 2,000 feet on the north tunnel and 585 feet on the south tunnel. At present there is a force of about 150 workmen, and this number will doubtless be increased in the near future. The rate of progress at present is from two to five feet each day, but with improved methods of tunnelling it is expected that this rate will be largely increased. — *Exchange*.

TRADE SURVEYS

The rushing activity in nearly all trade and manufacturing channels is due as much to confidence as to crops. In speculative channels there is an upward movement. Anthracite coal stocks have been selling at unprecedently high figures. September disbursements and treasury distributions have given a stronger tone to the money market than has been felt for years. The August bond purchases this year were $14,791,000, as against $6,000,570 for August, 1888. Then the fact that the trunk-line roads report their rolling-stock taxed to its utmost capacity also helps to strengthen confidence. All these things have stimulated the movement among Western trunk-line managers to establish a railway trust, which, honest as may their intentions be, they will fail to accomplish. A reference to the iron trade is necessary at this time. Present capacity is fully taxed. Pig-iron production, enormous as it is, is no more than sufficient for current requirements. Prices have hardened to the advancing point. The bar, plate, sheet and pipe mills are barely able to keep customers supplied. New works, involving the purchase of large iron and steel supplies, are heard of in all directions. Bridge work is crowding. Ship-building requirements are increasing. The effort of the Government to buy ships below cost has failed. Car-builders are soliciting car-building contracts from the railway companies for the coming winter, with good promise. The industries, big and little, are all picking up work. Rolling-mill plants are being extended. Recently, several pig-iron furnaces have blown in, and new furnaces are projected. In the coal trade a rushing demand has set in for bituminous. Coke will be advanced probably, on October 1, to $1.50 at ovens. Since July 1, one thousand additional ovens have been projected. In lumber business is reported as dragging, because more lumber has been prepared and sent to market than there is immediate demand for, but the distribution is simply enormous. In machinery, there never was such a vigorous demand. A vast amount of old machinery is being removed to make room for improvements and improved processes. Shops in the New England and Middle States are making over-time in scores of instances. Instances of extraordinary activity might be multiplied. There are no danger signals in the commercial field. Bank clearings, last week, were one-third greater than for corresponding week last year, according to bank returns. In foreign financial circles there is no uneasiness. The Bank of France has gained fifty millions in gold in a year, if the statement can be credited; while the Bank of England's gold has declined, as is to be expected. This decline will probably continue. In fact, the position of the Bank of England as a financial umpire will be more or less jeopardized in the near future through the tendency of capital to vacate its old haunts for better returns.

The jobbing interests of Boston and New York are qualified to express creditable trade opinions. The general sentiment is that the volume of business for the next six months will be 20 to 25 per cent greater, as exhibited by clearing-house returns, than for the six months between the autumn of 1888 and spring of 1889. The makers of agricultural implements and machinery never had such a rush of business as now. Barbed-wire sales are heavy. Stocks of farm implements are light, and the preparations being made this season for an extension of agricultural area next year denotes a confidence that means heavy purchases throughout the West and Northwest. Trade combinations are finding themselves in shoal water. The copper trust, after patching up its craft, is about going to pieces again. The tin-plate combinations have all been swallowed up in defeat, and the manufacturers are now in distress at the evidences of coming competition from American tin-plate-making enterprise. The tendency long ago pointed out in this column with reference to the eventual equalization of the cost of labor between different countries and people, is now manifesting itself in foreign lands Hosiery manufacturers claim that the advance at several foreign centres, coupled with honest custom-house appraisement at home, is making it possible to turn out goods at a profit which could not be touched a year ago. The carpet trade is in a prosperous condition, but the loom-capacity is so great that prices have not been advanced. The woolen interests are still at war with the wool interests; cotton-goods manufacturing is less remunerative than for years, but an adjustment is now in progress that will result in a wiser diversification of product. The silk-culture people are pushing through numerous discouragements, the chief of which is the anxiety of those experimenting to reap handsome returns the first or second year. Ramieculture is receiving more quiet attention. The textile-manufacturing interests are thriving under difficulties, and in the opinion of some who have their entire interests in this one field, there is a grand future for textile-goods manufacturers. Hosiery mills are springing up in new localities West and South. Woolen mills are projected for nearer home wool sources than New England, but the future centre of the woolen-goods industry is uncertain. A contest on tariff-duties is looming up, and the contest will not be confined to one article. A considerable element is favorable to an enlarged free list, and the entire tariff discussion will ere long be renewed upon a new basis. The rapid settling up of the country, and our increasing interest in an export trade, are true factors which will bring new elements into the discussion. There are increasing difficulties also among the masses of voters, who will not be able to understand why wages should decline under high duties. The manufacturing interests of the Middle States recognize impending dangers, and are preparing for them.

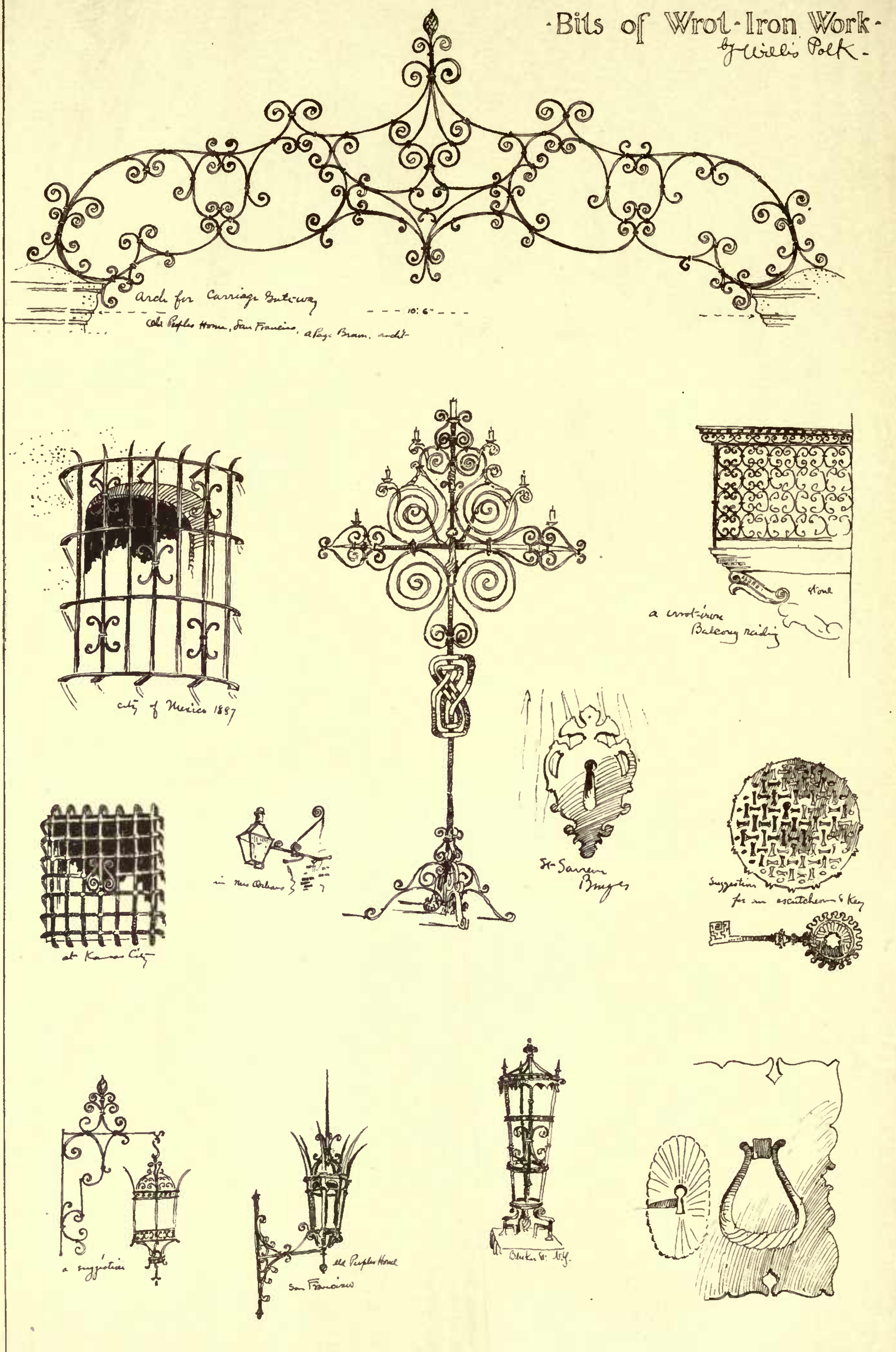
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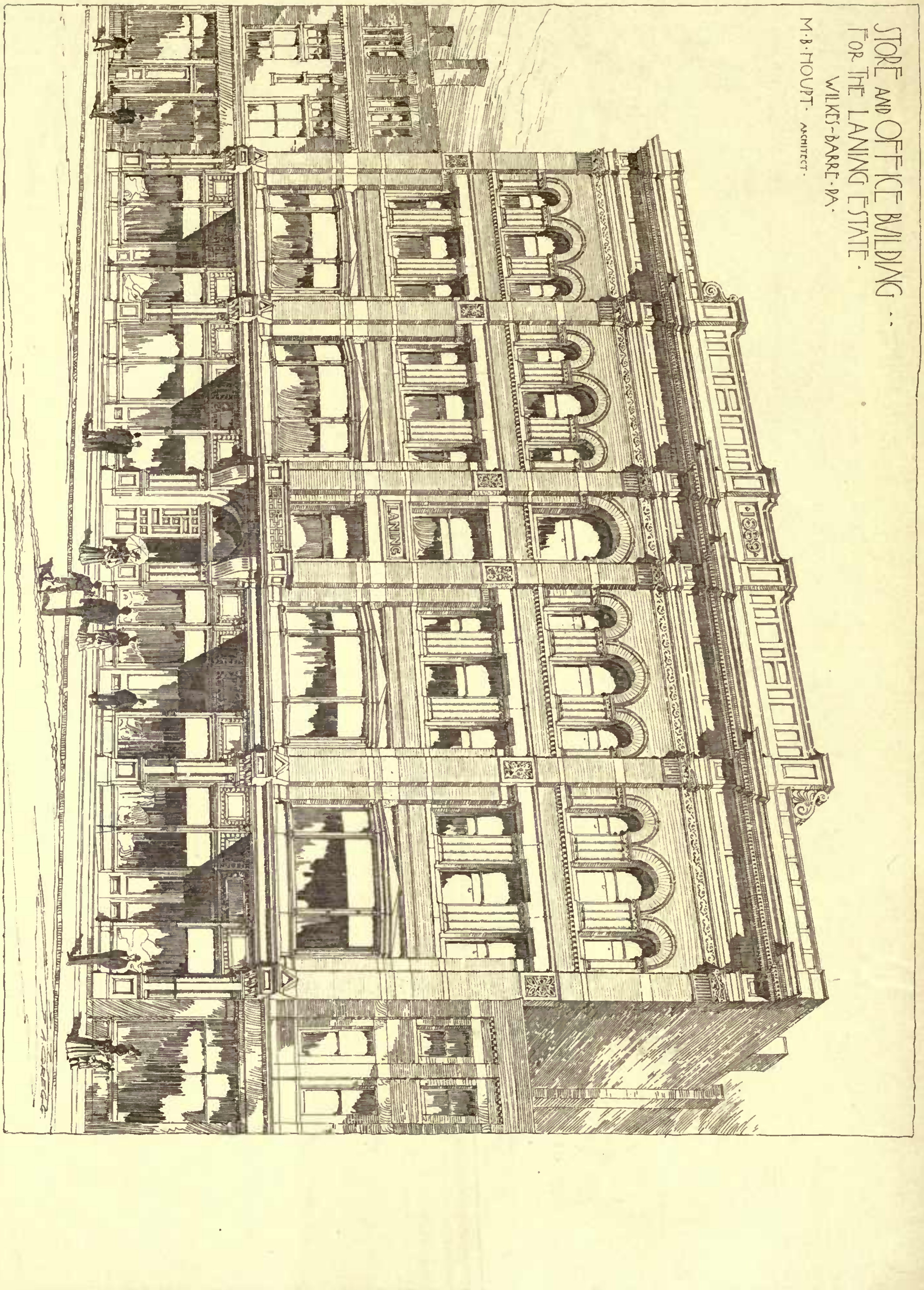


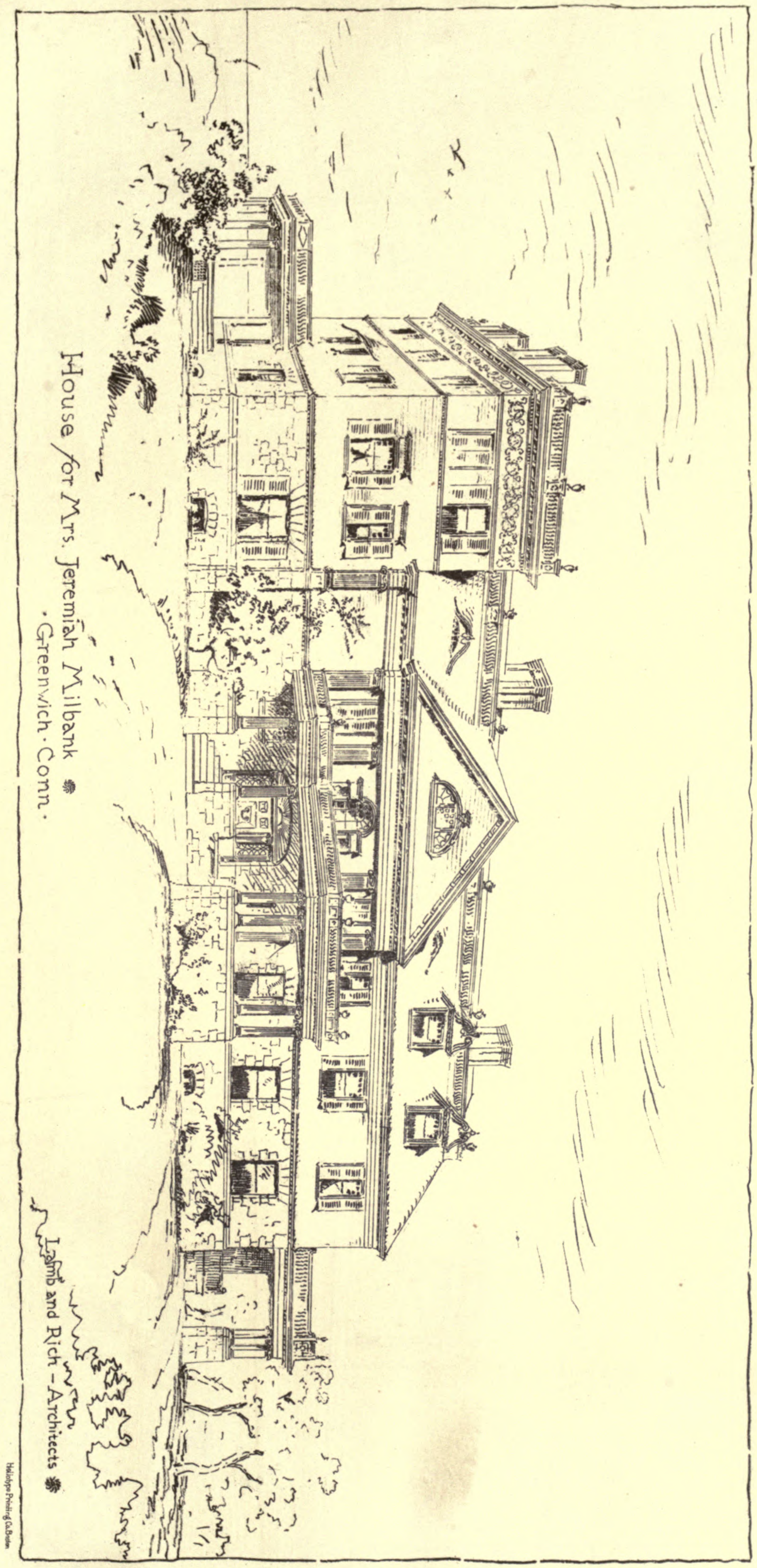
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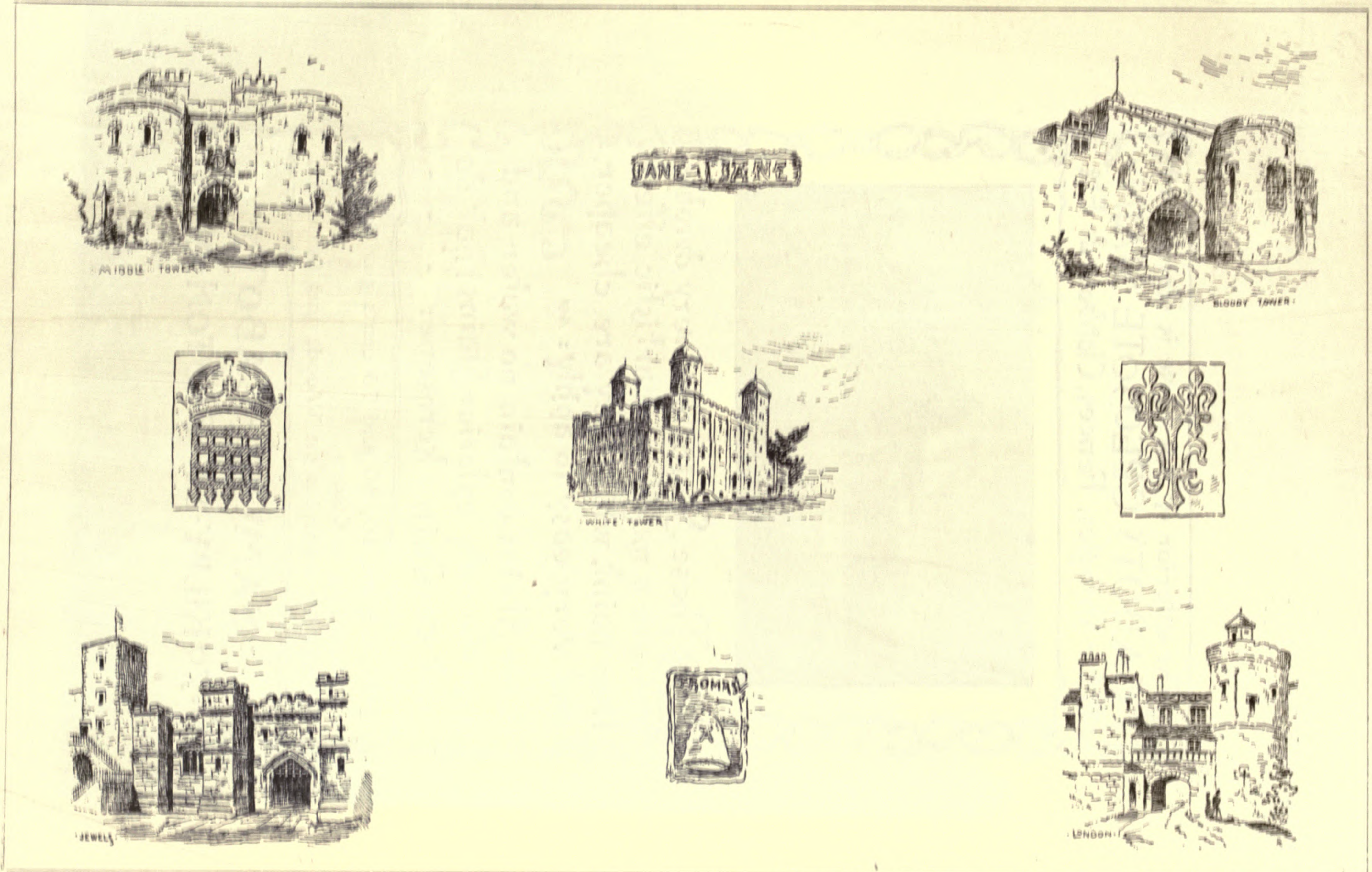
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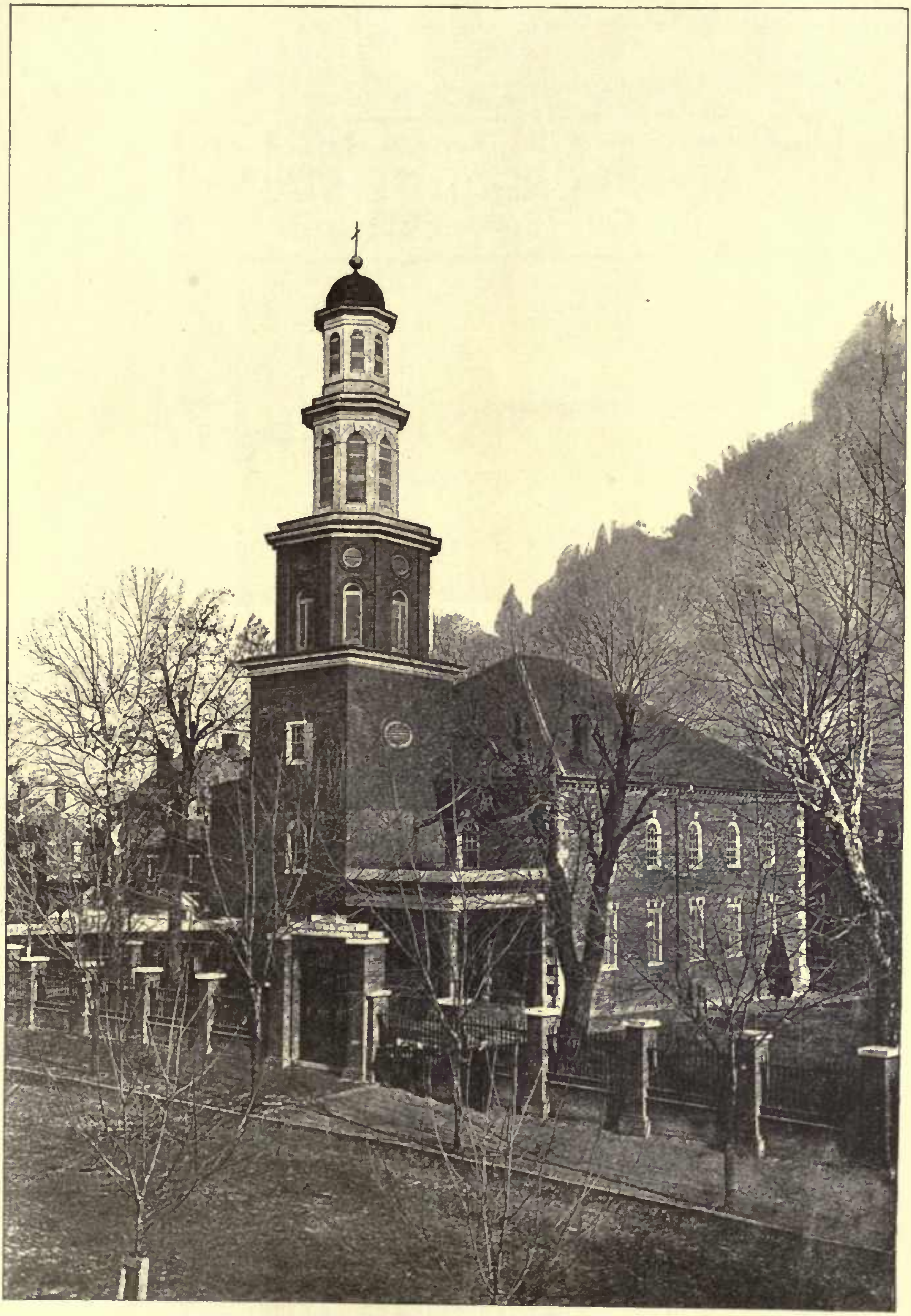
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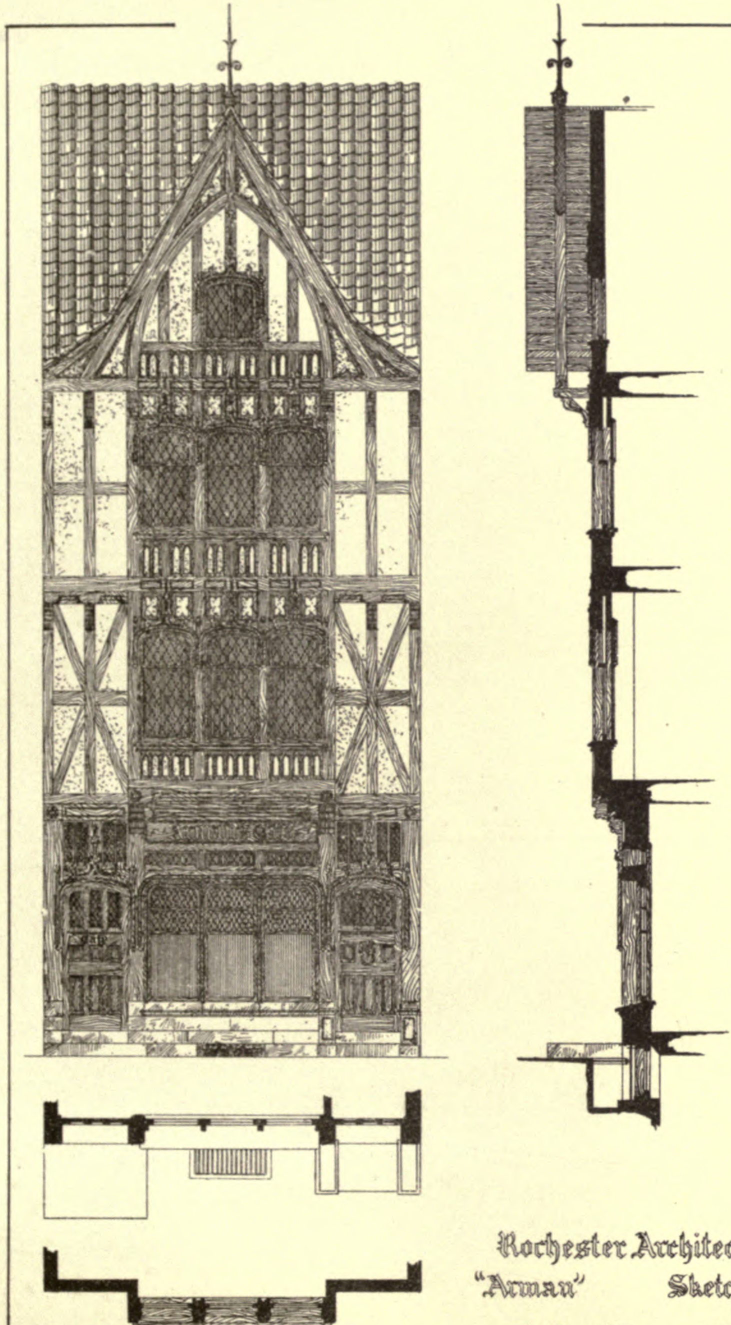

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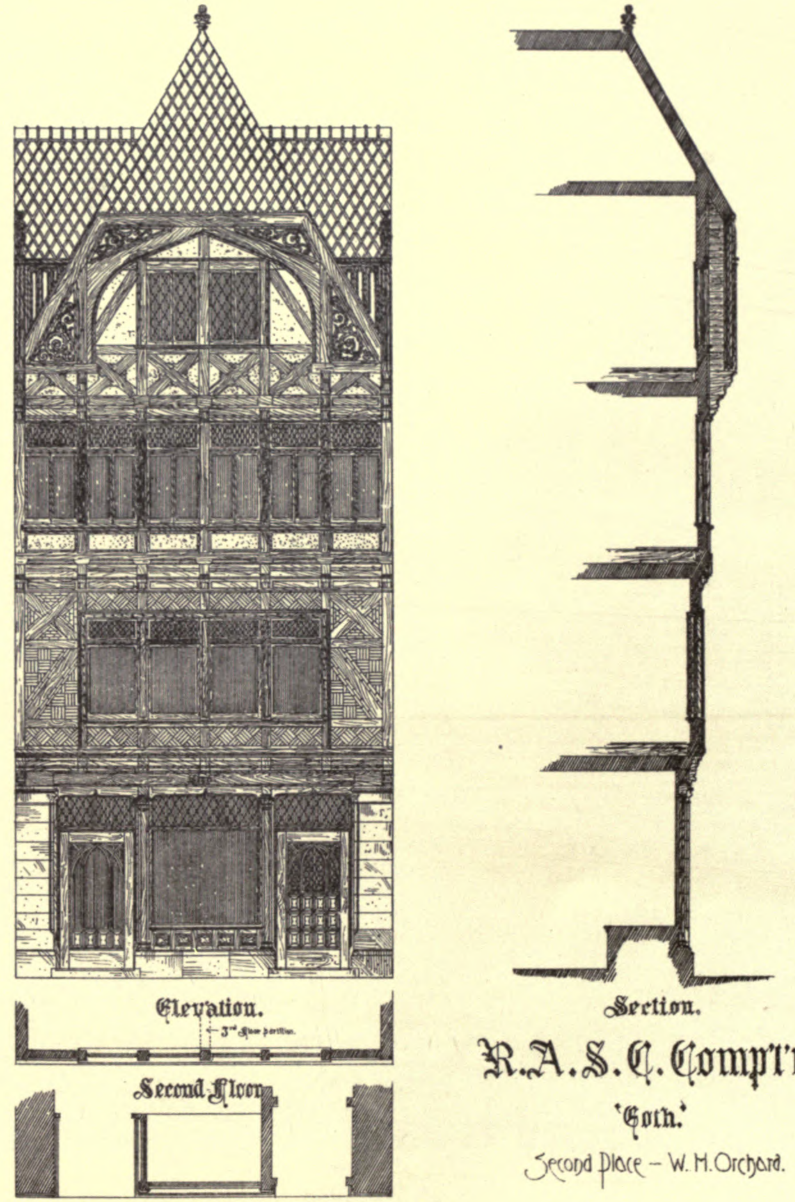
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• CHRIST CHURCH • ALEXANDRIA, VA. •



Rochester Architectural
"Armax" Sketch Club ~
First Place Edwin S. Gordon



R. A. S. C. Comp'n.
'Goth.'
Second Place – W. H. Orchard.



HOUSE OF A. W. NICKERSON, ESQ., DEDHAM, MASS.
SHEPLEY, RUTAN & COOLIDGE, Architects.

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THE Cincinnati Architectural Club will hold an exhibition of architectural drawings in Pike's Opera-house, Cincinnati, in November next, beginning on the 19th, and continuing one week, and earnestly solicits contributions from architects and draughtsmen in all parts of the country. Drawings in water-color, India ink and pen-and-ink are received. The Club will bear the cost of transportation both ways, and of hanging for exhibition, and three medals are to be awarded, a gold medal for the best exhibit of club-work, a silver medal for the best individual work among club-members, and a medal, offered by the Builders' Exchange, for the best water-color perspective. The jury is to consist of three prominent architects All drawings and studies to be exhibited should be sent by express, properly packed, and directed to John Zettel, Secretary, Room 81, 227 Main Street, Cincinnati, Ohio, and should be in his hands not later than November 10. The address of the consignor should be given in full, to insure safe return, and the subject of the work should be described, and notice of shipment should be sent to Mr. Zettel.

A FAMILIAR old question has come up, in an aggravated form, in Philadelphia. A certain firm of contractors began the erection of an eight-story building adjoining a small, older building. The bottom of the new cellar was planned far below the adjoining cellar, and in digging out the lot to the required depth, the old wall, being undermined, very naturally settled, causing the chimney to fall, and inflicting a damage of about three thousand dollars on the property. The owners of the injured building claim compensation from the contractors, who resist, on the ground that they have an official permit to erect the building according to the plans, which absolves them from all consequences to other people. We will not say what the decision of the Pennsylvania court will probably be, but it is of interest to remember that in New York, after many such disputes had been settled, on the principle that a man who carries down his cellar to an unusual depth, must protect his neighbors from injury by his operations, the further question of what constitutes an unusual depth was finally settled by the statute, which gives ten feet below the curb, we believe, as the standard, and ordains that if a man's cellar walls do not extend to that depth, he must underpin them to that extent, at his own expense, if they are imperiled by work on the adjoining lot; but that if any one wishes to carry his cellar below that depth, he can only do so on condition of underpinning, or otherwise securing, the adjoining walls from the ten-foot line down to the level of his own excavations.

WE are inclined to think that a real service might be done to architects, as well as to manufacturers of building materials, and others who have occasion to call the attention of architects to what they have to sell, by making suggestions from time to time in regard to the most efficient ways of bringing the minds of the two parties concerned together, so that the material-man might be sure that his name, and some description of his goods, would always reach the eye of architects who wished to look up the subject; while architects might be equally sure of finding, at any moment, the address to which they should send for goods of any particular sort, goods that they might, perhaps, never have needed before, but which, if they want them at all, they are sure to need in a hurry. It is hardly necessary to say to architects, but it may be of some interest to dealers to know, how perfectly useless are the circulars on which so many thousands of dollars are spent every year. Into the office of every architect who has practice enough to get his name into the little building papers these circulars come in such quantities as to be a positive nuisance. They are not read by the persons whom they are intended to reach, for the simple reason that these persons have something else to do, and that to read the circulars with which they are deluged would take nearly or quite all the time required for their office business, and the consequence is that most of them, whose wrappers indicate the character of their contents, are thrown into the waste-basket without being opened. Occasionally, a circular describing some novelty, or containing a price-list, or too expensively gotten up to be quite so summarily dealt with as the others, is preserved, and if the architect receiving it is a methodical person, it may be put with others, in some sort of order, in the hope that it may be possible to refer to it again on occasion. Unfortunately, this hope is a vain one. A year or two will probably elapse before the occasion comes, when some unusual requirement will be exactly met by the object which the circular describes. The architect remembers the circular, and opens the appropriate drawer to look for it. It is there, no doubt, but in company with perhaps a thousand other kindred documents, and after half an hour's rummaging he gives up the search, and turns over a few numbers of the professional journals to see if the article is advertised. If not, he perhaps sends a draughtsman to make some vague, and probably unsuccessful, inquiries at the neighboring stores, or, as is more likely, writes his specification so as to call for some familiar article of similar character, very likely not so good or so suitable, but which he knows where to get.

THE remedy which we would propose for all this confusion, troublesome and injurious alike to architects and dealers, is not suggested with a purely selfish object, for, although it would benefit us, it would equally benefit the other architectural journals, and would, we are sure, be most profitable of all to the persons most interested, the dealers themselves. This remedy is for all those who have anything to sell which they honestly believe to be worthy the attention of architects to advertise it in the columns of the technical periodicals which architects take, setting forth concisely its good qualities, its price, if possible, and the place where it is to be obtained. It is not amiss to accompany the advertisement with an illustration, as a sort of sign-board, to catch the eye of persons looking for it in a hurry; and the publishers can then be trusted to index the advertisement in such a way that architects can find it at a glance, no matter how many other advertisements of similar goods may appear beside it. To obtain the fullest return, the advertisement should be drawn with some care. We have seen an announcement of certain goods, to be had of the manufacturers at such a number on a given street, but with no accompanying clue whatever to the city in which the street in question was situated, nor could we have even remotely guessed, in case we had wanted any of the goods, where to write for them. Again, even an approximate mention of the price is of great assistance to architects, particularly with

novelties in the way of materials. Such things are generally supposed to be very costly, and many people are frightened away by their fear of the expense, who would buy at once if they knew the real price. For example, there is a clever device for opening and closing blinds from the inside, which is sold for about a dollar and a half a window, we believe, or perhaps even less. Now every one, according to our experience, who lives in a house with blinds, is delighted with any apparatus for managing them from the inside, but as the cost of the earlier appliances of the sort was four or five dollars a window, few persons could afford them, and the people who would order them at once at a dollar and a half a set would pay no attention to an advertisement which did not mention the price, imagining that the cost of all such things must be about the same. We know that advertisers do not like very well to quote prices, and say that it is very easy for architects to write to them and get such information if they want it; but architects are very busy men, who have little time to write letters, and must devote what they have to epistles of greater importance, so that, unless they have the facts placed before them, so that they can get just what they want to know without any trouble, they are pretty sure to choose something that they already know about, or in regard to which fuller information is presented to them. On the architects' side, an array of such advertisements as we have in mind, indexed as we would like to have them, would be a convenience such as the offices have never yet possessed. It is not common for an architect to want, at the time, a thing which he sees, or hears mentioned, but, if it seems to him valuable, he remembers the description, and a month, or a year or two, later, when the occasion comes, he wants to know just where to find it, and the patient and judicious advertiser then reaps his reward.

EVEN where the subject of inquiry is not a new appliance, but a staple article, or, perhaps, a well-known manufacturer or firm, it is often much more difficult than one would think for busy architects to find the addresses they want at the time they need them. Many a time, in our own experience, have we walked half a mile or more to consult at an express or newspaper office the directory of some city which was not represented in our own small business library; and we should have been very glad if there had been some means for collecting the class of addresses which we needed where we could get at them without so much trouble. The Directory of the National Association of Master Builders, which some intelligent person has produced to supply the want, has proved extremely useful, and, we venture to say, is constantly referred to by architects wherever it has penetrated; but a business directory cannot give all the information that is often desirable, nor does it classify the names so that the one wanted is always to be found at once. For instance, a few days ago we had occasion to write a telegram to Mr. X, a well-known manufacturer of fireproof building-blocks in New York. We looked for his exact address in the National Master Builders' directory, under the head of "Fireproof Blocks." It was not there, although the names of nearly all the other firms in the business were. We looked under "Paving," this being also a part of his business, but his name was not to be found, although his rivals reappeared, with others. Under the head of "Tiles," which he makes in large quantities, were many names, but not his. Being unable to think of any other heading under which he would be likely to be found in the directory, we turned to one of the professional journals to see if, by chance, he might not have an advertisement there. Fortune so far favored us that we found, not an advertisement nor an address, but a notice requesting us to look for the advertisement of the person sought for in the last number of the journal and in the next one. As the last one was out of reach, and the next one had not appeared, our perplexity was not greatly alleviated, and it was only by the merest chance that, on taking up the directory again, our eye fell upon the name we wanted, under a heading where we should never have thought of looking for it. Although the National Builders' Directory is, on the whole, very well arranged, unintentional deficiencies of this sort are, we suppose, inevitable; but, in the aggregate, they must cause a considerable loss of business to persons who ought to have had it, and would have had it if their addresses had been always easily available. In the early years of our practice we had a certain amount of electric gas-lighting work done by a well-established company, always to the perfect satisfaction of ourselves and our clients. After a time, wishing for their services again, we looked in the last city directory for their correct address, which, we thought, might have been changed during the year. To our surprise, the name was not to be found under the head of "Electric Gas-lighting" at all, nor under any other head which it occurred to us to refer to, although there were plenty of other addresses given. As they were the pioneers in the business in the city, and had probably, up to that time, done most of it, we concluded that the company had been dissolved, or absorbed in some other corporation, or had abandoned its comparatively modest industry for the more dazzling prospects of electric-lighting, or transmission of force, and called in other people, less known to us, to do the work we wanted. This went on for two or three years, during which, as it happened, we had some tolerably large contracts of the sort to give out, and it was not until we met one of the company in the street, and expressed our regret at their withdrawal from the business, that we learned that no change had been made except in the directory, and that they knew nothing about their omission from the list. In another case, an extensive builder, who maintained his own planing-mill and door and window factory, was, without his knowledge, left out of the list of carpenters and builders, and was only to be found under the head of "Planing-mills." On having his attention called to this he made inquiries, and was told that he could only appear once in the directory gratuitously; that if he wanted to be put among the carpenters he would be accommodated, but that, in this case, his planing-mill would be dropped from the list unless he paid something for having it left in; and that his name could appear under various headings by paying a suitable annual sum for each. Of course, there is nothing absolutely unfair in this, as the publishers of the directory could not give space to display every man's name gratuitously under all the headings that he wished, nor could it dictate to every one the heading under which he must be classified; but the system works to the advantage of those who know how to use it at the expense of the others. The man, for instance, who is announced separately as a dealer in "Lime," "Cement," "Sand," "Drain-pipe" and "Bricks" is much more conspicuous in the directory, and must catch more casual orders than one whose name is to be found only under the heading of "Lime, etc.," where the customer who wants a hundred barrels of cement, and finds plenty of cement-dealers mentioned, does not think of looking for it.

THE Troy *Times* has taken an interest in the question of irrigation, through its own knowledge of the dry, barren country near Troy, and has collected some statistics on the subject which have much more than a local interest. Notwithstanding the vast extent of the United States, and the dry climate of the immense tract east of the Rocky Mountains and the Sierra Nevada, which keeps many thousands of square miles of good soil almost perfectly barren, the number of acres of irrigated ground in this country is, as yet, only seven million, five hundred and fifty thousand, of which three million are in California, and two and one-quarter million in Colorado; while in Utah, Arizona, New Mexico, and Texas hardly more than a beginning has been made. In Egypt there is nearly as much irrigated territory as in the whole United States; yet Egypt has but a single river from which to draw supplies of water, while our own country is traversed in all directions by rivers, and, even in the desert, generally yields water abundantly on sinking artesian wells. Every one does not know how cheap and valuable these latter are. In California, a well three hundred feet deep costs about six hundred dollars. If the well reaches a good supply of water, a pump may be, and often is attached, which will raise and distribute twelve or thirteen thousand gallons of water a minute. This is enough to cover nearly seven hundred acres of land with water an inch deep every twenty-four hours; yet, if the lift is not more than ten feet, the net force required is only about thirty horse-power, and, with all necessary allowance for friction, a fifty-horse-power pumping-engine would easily do the work with a consumption of about two tons of coal per day. An inch of water per day would be eight times the average rainfall in the Mohawk Valley, which may be taken as the model of agricultural prosperity in this country, and a little admixture of city sewage would make the irrigating water a source of perennial fertility.

EQUESTRIAN MONUMENTS.[1] — XX.

THE CRUSADERS. — II.



THE Battle of Hastings took place in the south-eastern part of England, and probably many of the Normans who remained in England settled there first, built castles and planted the family tree to grow in English soil. Amongst the present members of British nobility whose possessions lie in the southern part of the island, and who trace their descent back to the Normans, is the Marquis of Bute, a man of great wealth and one who maintains so intelligent an interest in matters of art that it was quite natural that when he decided to restore one of his ancestral possessions, Cardiff Castle, he should place the work in the hands of the late William Burges, who fairly revelled in the opportunity and devoted himself to the carrying out of the repairs with the greatest archæological exactitude, so far as mere restorations went, while no one was so capable as he to bring the new work into architectural harmony with the old. An important feature of the design was the grand staircase, and here Mr. Burges proposed to set on the main newel-post an equestrian statue of some one of the illustrious ancestors of the owner. Just which one it was to be is not certain; but at any rate it was a Norman knight and for these purposes it may be assumed that he may have taken part in some crusade. At Mr. Burges's death, however, the Marquis abandoned the restoration, the work has been left unfinished, and it is doubtful whether Mr. Nicholls, to whom Mr. Burges would probably have entrusted the making of the statue, ever made a model. The annexed cut, which is based on a drawing published in the *Architect*, in 1881, shows what might have been the character of the work.

Other might-have-beens which are more rightfully introduced here, since they reached the stage of full-size models, are the equestrian groups with which it was proposed to ornament Blackfriars Bridge, London, which is only less familiar to readers and travellers than London Bridge itself. In point of age, [1760–1770] it is the third of the London bridges, and is of engineering and architectural merit because there first elliptical arches of great span were used — the central one of the nine arches is 100 feet in span, the others measure 70 feet: the length of the bridge is 1035 feet and the width 42 feet. Built of Portland stone it has had to be repaired at



The Grand Staircase, Cardiff Castle.

intervals, but it is essentially the original bridge save that, we believe, the growth of traffic has absorbed the entire width of the structure for vehicles, and the sidewalks have been bracketted out on either side in iron. Blackfriars Bridge has always been the object of special regard, and in 1880 it was proposed to heighten its attractiveness as a matter of art by placing upon the parapet pedestals groups of sculpture which should represent some of the many historical personages of English history. Accordingly a competition was held at that time in which over fifty designs were



Henry V, C. B. Birch, Sculptor. From *Building News.*

submitted, but the character of the work may be surmised from the fact that the jury, three Royal Academicians, Mr. Watts, Mr. Marshall and the President, Sir Frederick Leighton, declined to award any of the six prizes which were within their endowment. Of course, this fiasco put an end to the undertaking, and also occasioned a good deal of bitter discussion in the public prints. In 1884 the project was revived, and a limited competition was held in which Messrs. G. G. Adams, T. Brock, R. Belt, C. B. Birch, H. H. Ashmead, J. E. Boehm, T. Woolner and Hamo Thornycroft were invited to take part. To aid the competitors and to give the public an idea of what was intended, a cast was taken of Clesinger's equestrian statue of Francis the First at the Crystal Palace, and set up on one of the pedestals of the bridge. The statues were to be 15 feet high. This competition, like the first, resulted in nothing, although the authorities regarded the proprieties so far as to pay the competitors something for their labor. Of these five groups the most successful was Hamo Thornycroft's "Edward I," who for two years was a crusader in Palestine. The model, which exhibits a remarkably successful rendering of arrested motion, promised to possess that grand quality of permanently acceptable sculpture, quiescent dignity. It looks as if it might, when cut in stone or cast in bronze, have a greater air of pertinency and permanence than most existing statues, and it will be noticed that the statues which least excite the combativeness of the critic are those where stability is the most and motion the least pronounced. Thornycroft is the only sculptor who has dared to rein in a horse sharply in the middle of a stride, and make his horse bring his feet naturally to the ground before the strain is eased by the bringing of the hind-legs forward. Others who attempt the same thing rein their horses backwards on their haunches, and deprive the pose of the air of stillness which was one of the ends aimed at.

Another good model was Birch's "Henry V," which has about it all the lovableness of Falstaff's "Prince Hal," and promised to be a very successful example of pictorial sculpture, which represented a handsome young monarch on an elaborately-accoutered horse, showing himself to a crowd of admiring Londoners.

The least successful was Belt's "Edward, the Black Prince," archæologically correct, no doubt, for that doughty warrior was given to great plainness in his armor, and preferred small and agile horses, rather than the more ponderous war-horse. The model is so distinctly mediocre that one is inclined to believe that there was a good deal of truth in Mr. Lawes's contention that most of Mr. Belt's success was due to the skill of his faithful "ghost," and that

[1] Continued from page 114, No. 715.

this must have been an occasion where Mr. Belt undertook to do his own modelling.

Brock's "Edward III" was a work of good average character, and as a member of a series would be accepted without cavil; but it lacks the individuality of characterization necessary for a work which could hold its own in an isolated position. It has a striking resemblance to the statue of Godefroy de Bouillon at Brussels.

Mr. Adams had the happy idea of making the utmost of people's love for association by selecting as his subject, for a place on one of London's great bridges, Fitzwalter, the hereditary champion of the City of London — not, as might be supposed, the Robert Fitzwalter, chief of the barons who extorted Magna Charta from King John, and, at a later day, died a Crusader at the siege of Damietta in 1234; but his grandson Robert, a sufficiently distinguished citizen, perhaps, but not so worthy of a commemorating statue as his more illustrious progenitor. It seems as if Mr. Adams had wantonly sacrificed for the securing of the acclamation of those who are influenced by association the chances of securing greater applause by a successful rendering of so rugged a character as must have been possessed by the old Crusader and "Marshal of the army of God and the Church." To make a successful rendering of a man and horse wrapped up in tabbard and horse-cloth, which, however gay and ornamental they were in actuality, with blazoning of gold and color, are hardly things to promise satisfying results when rendered in sculpture, was so hopeless an undertaking that it is small wonder the result was no better. In connection with this bridge, but whether they were undertaken independently and subsequently to these competitions, or whether they were the elaboration of sketches prepared for the first, equestrian statues have been also modelled of the Black Prince by Waldo Story and of Cromwell by H. R. Pinker.

Boehm's "Richard I" is the second, as previously mentioned, of the two that now exist in England, and its author is an alien, being of Hungarian birth, who, in addition to his merits as a sculptor, has had the address and good fortune to secure the patronage of the royal family, for whose several members the most of his work has been done; and not done in vain, for besides reputation and monetary reward, he has, within a few months, been raised to a baronetcy by a sovereign grateful for the success with which he had immortalized in bronze the ever-to-be-lamented Prince Albert.

Mr. Boehm is disposed to consider his "Richard Cœur de Lion" as his most successful work, and at a recent exhibition of contemporary work selected it as the subject by which he preferred to be represented. It is certainly a successful piece of modelling — much more so than Marochetti's figure — and, very likely, the reason is that it is so evidently inspired from the "Colleoni" at Venice: the horse has much the same air — in a much less degree — of resistless motion, the riders' seats are nearly identical, and Richard sways to the stride of his horse much as Colleoni does.



Edward I. Hamo Thornycroft, Sculptor.

Of other English Crusaders there appear to be no equestrian statues.

A few years ago there was talk of erecting at Paris an equestrian statue to Philip Augustus, but, if the suggestion resulted in overt action, it is not known what it was. At any rate, no such statue has as yet been set up in honor of Richard's great rival and companion in arms; nor have other famous Crusaders been more lucky. It appears to have been quite a matter of chance whom posterity would select for such commemoration, and the less known leaders have fared as well as the best. Even Louis IX, St. Louis, has been neglected, and his was a personality which seemingly should appeal with peculiar emphasis to French sculptors.

Baldwin of Flanders

> "Baldwin, whose dreams are of a diadem,
> Since last the Turks have tugg'd Jerusalem
> From Lusignan, content to wait meanwhile
> As Count of Flanders, till his fortunes smile:
> Him, also, Hainault's hardy race respect,
> Scion of Charlemagne by line direct,
> And cousin to the Royalty of France."
>
> — From Owen Meredith's "*The Siege of Constantinople.*"

can hardly be considered an insignificant person, but he is, at least, less well known than Richard and Philip, whose contemporary he was, though he did not join with them in the Third Crusade, but, a few years later, became a leader in the Fourth Crusade, which, as has been shown, stopped short of its goal; for, when the army reached Venice, it was found that the Venetians would not provide the promised transportation, save for full prepaid rates, and so, by stress of







circumstance, Baldwin was persuaded by the Doge Dandolo to join the Venetians in an attack on Zara, a revolted dependency, and then to attack and capture Constantinople. One result of this was the transferrence to Venice of the Bronze Horses of St. Mark's, and another was the crowning of Baldwin as Emperor of Constantinople. He sustained this position for only a year or two, as he and his adherents soon fell victims to the intrigues of Johannes, King of



Richard Coeur de Lion. By J. E. Boehm, R. A. From the *Art Journal.*

Bulgaria, who made Baldwin his prisoner, and finally put him to death. At least, this is what he gave it to be understood had happened when he sent an answer to Pope Innocent III, who loyally



Count Baldwin of Flanders, Mons, Belgium. H. Lemaire, Sculptor.

stood by the leader of his crusaders, and begged for his release. But the wording of the answer was so ambiguous, and the particulars so wholly wanting, that Baldwin's friends for a long time entertained the hope that he would finally escape from durance as Richard had done before him, and once more return to rule over Flanders. Meanwhile, his daughter Jane — fit type for Shakespeare to model a Goneril or a Regan upon — ruled in his place. The hopes' and beliefs of Baldwin's friends seemed to be fully justified when at last, twenty years after the fact of his capture was known, there appeared in Flanders an old man of kingly bearing, who announced that he was Baldwin, escaped at last, and ready to resume his rights once more. His story was plausible, his statements coherent, his recollection of events in his own and other people's careers before the time of his capture was reasonably precise and full; his figure and face were, his friends thought, such as Baldwin's might be after a score of years in captivity; and yet there was obvious reason for distrust and doubt. How do daughters in these days welcome an old stranger who gives him-elf out as the father who was reported "missing" after some battle in the Civil War? Some with gladness and a full conviction of the truth of the story, no doubt; others with hesitancy and scepticism, but probably none without making for themselves and through their friends searching inquiries into the truth of the pretender's claims. The Countess Jane was cold-blooded, ambitious, heartless, may be. She had for twenty years



Francis I on a Pedestal of Blackfriars Bridge. Clesinger, Sculptor.



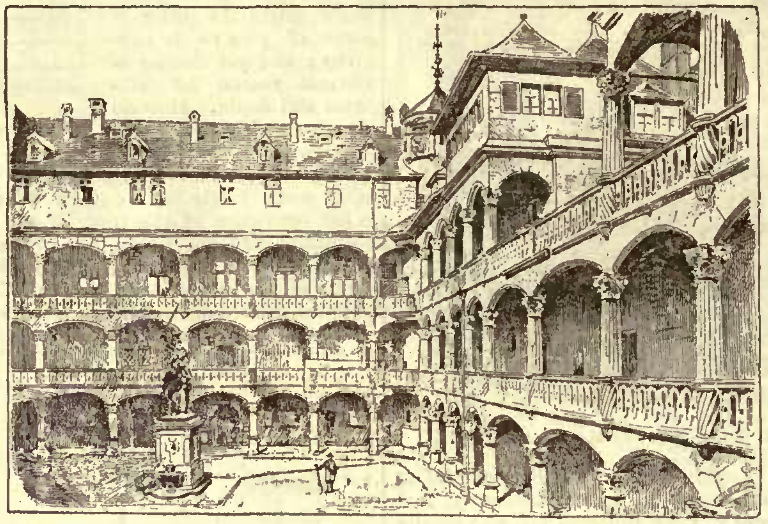
Count Eberhard, Stuttgart. L. von. Hofer, Sculptor.

tasted the sweets of power, and she had no desire to abandon, even for a time, the position she had held so long. She disbelieved the wanderer's story, she denied he was her father; she felt, at any rate, no filial affection warming her bosom, and feeling, perhaps, that

local sentiment was setting too strongly against her, departed to France and laid the case before Louis VIII. He consented to act as arbiter, and the so-styled Baldwin was summoned to appear at the court of France. This he did, and submitted himself and his story to searching examination. In the main he stood the test well; but the fact that he could not answer some of the many questions put to him was seized on by the friends of Jane as proving that he was an impostor, and he was so adjudged, and ordered to leave France within three days on penalty of death. Trying to escape in disguise through Burgundy, he was recognized by a Burgundian noble, who sold him to the Countess Jane for 4,000 silver marks; then, having thus secured a semblance of being in the right of the matter, she put the unfortunate to the torture, and not unnaturally succeeded in wringing from him a confession that he was an impostor. This accomplished, the unhappy man was exhibited in mock state in several cities, and finally hanged. The fact that such historians as Sismondi, Michelet and Michaud believe that the man was actually Baldwin, and the further fact that Henry III of England, his contemporary, believed in the truth of his story, make it extremely probable that the Countess Jane knowingly committed patricide.

It is to this Count Baldwin, and not to the equally famous brother of Godefroy de Bouillon, who took part in the First Crusade, that there has just been erected at Mons a bronze equestrian statue by Lemaire.

The fact that Count Ebehard "im Bart," later Duke of Würtemberg, once made a pilgrimage to Jerusalem, which led to the turning over of a new leaf in a somewhat disorderly career, although this journey was taken long after the Crusades, and the further fact that Hofer's statue of the Count in the courtyard of the old *schloss* at Stuttgart is represented in full armor, may be taken as sufficient excuse for introducing him here with other mailed warriors.



Court-yard of the Old Schloss, Stuttgart.

EDWARD I, surnamed Longshanks. Born 1239; gained the battle of Evesham; married Eleanor of Castile, who accompanied him on his crusade, and is said to have saved his life at the risk of her own by sucking the poison from a wound given him by an assassin's dagger in the Holy Land; became king in 1272; conquered the Welsh under Llewellyn, and annexed Wales; espoused the cause of John Baliol in the struggle between him and Robert Bruce for the crown of Scotland, and overran and subdued that country, defeating Wallace at Falkirk; but died (at Burgh-upon-Sands in 1307) while being carried towards the Border on his way to avenge the death of Comyn, who had been killed by Bruce. In his reign the English Parliament was established in its modern form, and many wise and just measures instituted. The title of Prince of Wales was then first borne by the heir apparent.

THORNYCROFT.—Hamo Thornycroft, R. A., who belongs to an artistic family, his father and mother both being sculptors, was born in London in 1850. He studied under his father and at the schools of the Royal Academy, first exhibiting at that institution in 1871. He largely assisted his father, Thomas Thornycroft, in the production of the fountain in Park Lane, London, and the equestrian monument to Lord Mayo in Calcutta. His chief productions have been "A Warrior bearing a wounded Youth from the field of battle," which won the biennial gold medal of the Royal Academy in 1875; "Lot's Wife"; a study for a memorial to Harvey, the discoverer of the circulation of the blood; "Artemis"; "Teucer"; "The Mower"; "A Sower"; "Medea," and a statue to General Gordon for Trafalgar Sqnare. He has executed the memorial to the poet Gray in Pembroke College, Cambridge, and a bust of Coleridge in Westminster Abbey.

HENRY V.—Born at Monmouth, 1388. Eldest son of Henry IV. He renewed the claims of England to the French crown, and these being disallowed, made war on France; besieged and took Harfleur; won the great battle of Agincourt; took Rouen after a siege of half a year; and finally made peace on condition of receiving the Princess Catherine in marriage and being made Regent of France during the rest of her father's life, and succeeding to the French crown at his death. Married Catherine of Valois, and died at Vincennes, 1422.

BIRCH.—Charles Bell Birch, A. R. A., was born in London in 1832. He studied in Berlin nnder Rauch and Wichmann, and in England at the Royal Academy schools and under Foley, one of whose assistants he became. In 1864 he won the Art Union prize of £600 for his group entitled "A Wood Nymph." He has executed two equestrian groups, one representing "The Wounded Trumpeter" (also known as "The Last Call"), and the other "Lady Godiva"; and an equestrian statuette (in silver) of William III at the Battle of the Boyne. His other monumental works are statues to Lord Beaconsfield and General Earle for Liverpool; one to Dr. Chadwick at Bolton; one to David Reid at Cranbourne; and others to the Maharajah of Bulrampore, to Lieut. Walter Hamilton, and to the Earl of Dudley. He has also produced the following: "Retaliation"; "The Good Samaritan"; "Margaret and the Jewel Casket" (from Faust); "Adam and Eve"; "Whittington;" "Margaret Wilson, the Christian martyr"; many busts and twenty designs for the Art Union, illustrating Byron's "*Lara*."

EDWARD THE BLACK PRINCE.—Born 1330; Prince of Wales; son of Edward III; married Joan, Countess of Salisbury; was the chief cause of the victory of Crécy, 1346; invaded France in 1355 with 60,000 men, gained the battle of Poitiers in 1356 with an army of only 10,000 men against tremendous odds, the French horse alone nnmbering 60,000; died in 1376.

BELT.—Richard Belt was born in London in 1851, his father being a blacksmith. The young Belt first worked at a mechanical engineer's and then with a firm of printers, but finally managed to obtain some instruction in modelling and then to attend the schools of the Royal Academy. He afterwards worked in Foley's studio and then sent his first contribution to the Royal Academy in 1873, finding a friendly patron in Dean Stanley, and in time becoming a fashionable portrait-sculpter, receiving commissions from Royalty itself. In 1882, however, Mr. C. B. Lawes, a former associate of Mr. Belt, and himelf an amateur sculptor, wrote or inspired an article in *Vanity Fair*, which charged that much of the work which passed as Mr. Belt's was the production of others in his employ, and that he was incompetent to produce it himself. Mr. Belt brought a libel suit against Mr. Lawes, which became quite a "celebrated case," many famous people being summoned as witnesses and experts, and resulted in a verdict of £5,000 damages for the plaintiff. In 1886 Mr. Belt was tried on a charge of obtaining money by false pretences from Sir William Abdy, and, being found guilty, was sentenced to a year's imprisonment with hard labor. His works include a memorial to Izaak Walton in Stafford Church; one to Charles Kingsley in Chester Cathedral; one to Beaconsfield in Hughenden Church and in the Guildhall, London; a statue of Byron in Hyde Park; one of William Spottiswoode in the Royal Institution, and one of the Prince Imperial in Windsor Castle; besides a figure of "Hypatia," and a great number of portrait busts and statuettes.

EDWARD III.—King of England. Born at Windsor, 1312; proclaimed king under a regency, 1327; married Philippa of Hainault, 1328; defeated the Scotch at Halidon Hill, 1333; invaded France, and gained the battle of Crécy, 1346; captured Calais, 1347; made peace after the victory of Poitiers, 1356; but subsequently lost nearly all that he had gained; died 1377. During his reign the movement of Wycliffe against the clergy was begun; the House of Commons first held its meetings apart from the House of Lords; Flemish weavers were introduced into England; Windsor Castle was erected, and the Order of the Garter founded.

BROCK.—Thomas Brock, A. R. A., was born at Worcester, in 1847, and after attending the local School of Design, worked for several years in the modelling department of the Royal Porcelain Works in that place. He came to London in 1866, and studied at the Royal Academy schools and under Foley, whose principal assistant he became. On his master's death in 1874, by the terms of his will, Brock was appointed one of the three pupils of Foley, who were to finish his uncompleted works, and he carried out the O'Connell monument in Dublin, the equestrian statues of Earl Canning at Calcutta and Field-marshal Viscount Gough at Dublin, with other works. Among his own designs are equestrian statues of the Maharajahs Sir Jung Bahadur and Sir Runnoodeep-Sing. These were executed for the Nepaulese Government, and are both at Katmandu, in India. His equestrian group called "A Moment of Peril," was bought for the British nation by the Royal Academy under the Chantrey bequest. His chief works, after those named, are statues of Richard Baxter and Sir Rowland Hill at Kidderminster; Robert Raikes (the founder of Sunday-schools), and Sir Bartle Frere on the Thames Embankment; Sir Richard Temple at Bombay; Sir Erasmus Wilson at Margate; Daniel O'Connell for Melbourne, and three of the Queen, for Worcester, Capetown and Lucknow, respectively. He has also produced a monument to Sir Harry Parkes in St. Paul's Cathedral, and one, erected in Clanabogan Ireland, to the memory of the officers of the 66th regiment who fell at Maiwand. His bust of Longfellow is in Westminster Abbey, and he has modelled ideal figures of "Salmacis"; "Paris"; "Œnone"; "Hereward the Wake," and "The Genius of Poetry."

FITZWALTER.—Sir Robert Fitzwalter, "The City's Champion," Castellan and Chief Banneret of London, was a grandson of the celebrated Robert Fitzwalter, "Marshal of the Army of God," and leader of the Barons in the time of King John. He was in the wars of Gascony, in the retinue of Edmund, Earl of Lancaster, and continued there until he was summoned (1395) to Parliament as a baron. He was much engaged in the Scottish wars, and died in 1325.

ADAMS.—George Gammon Adams is a contemporary English sculptor, who has exhibited at the Royal Academy for over forty years, beginning in 1841. At the Great Exhibition of 1851, he was represented by a group of "The Murder of the Innocents," and a bas-relief of a "Combat of Centaurs and Lapithæ." He made the statue of Sir Charles Napier in Trafalgar Square, London, and one of the Rev. Hugh McNeile in St. George's Hall, Liverpool, and several monuments to members of the Napier family of soldiers, in St. Paul's Cathedral. His other works include "The Diver," "A Minstrel contesting with the Nightingale," and a quantity of busts and portrait medallions and commemorative medals.

BOEHM.—Sir Joseph Edgar Boehm, R. A., was born in Vienna, of Hungarian parents, in 1834. He was educated in Vienna and London, and studied his art in Paris and Italy. He settled in England in 1862, and became a British citizen three years later. He has executed a great number of statues and monuments, also many portrait busts and statuettes, receiving numerous commissions from the Royal family and from the British Government. From a long list of works may be mentioned several statues of the Queen; "John Bunyan," at Bedford; "Sir John Burgoyne," and "Lord Lawrence," in Waterloo Place, London; "Carlyle," in Chelsea; "Lord Northbrook," at Calcutta; "Lord John Russell," in the Houses of Parliament; "Wm. Tyndale," on the Thames Embankment; "Sir Francis Drake," at Tavistock and at Plymouth; "Beaconsfield," in Westminster Abbey; "Darwin," in the new Natural History Museum at South Kensington; and "King Leopold," of Belgium, the "Prince Imperial" and the "Duke of Albany," in Windsor Castle. Other monuments are those to the Princess Alice and her daughter for the Royal Mausoleum, at Frogmore; Dean Stanley, and Lord Stratford de Redcliffe for Westminster Abbey; Archbishop Tait for Canterbury Cathedral; General Sir Herbert Stewart and Gen. Gordon, for St. Paul's; and one to Lord Cardigan (of Balaclava fame), in the Church at Deene Park, Northamptonshire. Mr. Boehm's equestrian statues include the "Duke of Wellington," at Hyde Park Corner (replacing Wyatt's statue); "Lord Napier of Magdala," at Calcutta; the "Prince of Wales," at Bombay; and the "Prince Consort," for Windsor Park. Besides these he has modelled the following equestrian sculptures: "Wilhelm and Lenore," which belonged to the late Empress of Russia; "St. George and the Dragon"; and various portrait-statues of horses (some life size and others small), among them being several celebrated racers, for English noblemen. Of this nature is a group of "Doncaster and Groom," in the Stable Yard at Eaton; "King Tom," at Mentmore Park, and a "Clydesdale Stallion rearing," at Luton-Hoo Park. A large marble group of a man leading a bull was at the Royal Academy of 1887; a colossal lion and lioness has been made for Lord Leicester, at Holkham; and a sea-lion in black marble for a fountain in the hall of Sir John Millais's house. His bust of Whistler, and his statuettes of John Leech and Thackeray mnst not be overlooked. Mr. Boehm is a member of the Academies of Florence and Rome, won a second-class medal at the Paris Exposition of 1878, and in 1881 was appointed Sculptor in Ordinary to the Queen. He was made a baronet in 1889.

BALDWIN IX, Count of Hainault and Flanders, afterwards Baldwin I, Emperor of Constantinople, was born at Valenciennes in 1171. He was the son of Baldwin, Count of Hainault, and Margaret, sister of the Count of Flanders. In the year 1200 he accompanied the fourth crusade, and in 1202 joined the Venetians in their attack upon the Eastern capital. He was crowned Emperor in May, 1204, but in the following year was made prisoner by the King of the Bulgarians, and was either executed by order of that monarch or died in prison in 1205 (or 1206). Baldwin was much esteemed by the Greeks for his charity, temperance and justice.

Lemaire.—Hector Lemaire was born at Lille. Pupil of Dumont and Falguière. He has won several medals. He first exhibited at the *Salon* in 1869. His works include "Samson betrayed by Delilah"; "Nydia"; "The Age of Gold"; "The Bath"; "Maternal Love"; "Filial Love"; "Immortality"; "History"; "Morning," and a bas-relief of "Marriage" for the Mairie of the XVIth arrondissement of Paris. He has also produced a number of portrait and ideal busts.

Count Eberhard (called "the Bearded").—Eberhard, count and afterwards first duke of Würtemberg, was born in 1445. He succeeded to the title in 1457, and was placed under the guardianship of his uncle, Count Ulrich. At fourteen, he threw off this restraint and assumed the government, not, however, discharging its duties but intent only on gratifying his pleasures. But later he was, by some means, brought to serious reflections, and undertook a pilgrimage to Jerusalem in 1468. He also visited Italy, became acquainted with some of the most famous scholars of the age, and married Barbara, daughter of Lodovico di Gonzaga. He began to study and to take a practical interest in the promotion of the new learning, and at the instigation of his wife, founded, in 1477, the university of Tübingen. He befriended the famous scholar Reuchlen, whom he made his secretary and councillor; by the treaty of Minzingen, made in 1482, he secured the future indivisibility of Würtemberg; sympathized with the desire for the reformation of the church; and, though a lover of peace, knew how to bear the sword when war was necessary. He was made Duke in 1495, and died in the following year.

Hofer.—Ludwig von Hofer, born at Ludwigsburg, in Würtemberg, in 1801, was educated at Stuttgart and Munich, working in the last-named city upon the ornamentation of the Glyptothek. In 1823 he went to Rome and worked for five years in the studio of Thorwaldsen, executing in marble that artist's "Angel of Baptism," and modelling a "Psyche." On his return to Germany, King William of Würtemberg commissioned him to execute two colossal marble groups of Horse-Tamers which are now in the Palace Gardens at Stuttgart, together with his "Rape of Hylas." He was also charged with copying a number of the most celebrated antique and modern statues (including the various types of Venus) for the Villa Rosenstein and the Palace Gardens. Hofer made the "Concordia" statue (of bronze, fifteen feet high) on the Jubilee-Column, the equestrian monument of King William of Würtemberg at Stuttgart, and a "Cupid in Anger," in Rosenstein.

[To be continued.]

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

A STREET IN VIENNA, AUSTRIA.

[Gelatine Print, issued only with the Imperial Edition.]

This same view was published as a photo-caustic print in this journal several years ago, but as we did not have that process under satisfactory control at the time the resulting view was hardly recognizable, and it has seemed worth while to reprint it in better style.

HEVER CASTLE, KENT; KNEBWORTH, HERTFORDSHIRE; CHARLTON HOUSE, KENT; HATFIELD HOUSE, HERTFORDSHIRE; BERKELEY CASTLE, GLOUCESTERSHIRE; COBHAM HALL, KENT.

[Issued only with the Imperial Edition.]

These plates are reprinted from Hall's "*Baronial Halls and Picturesque Edifices of England.*"

AN OLD PIANOFORTE AT OAKLAND, CAL.

This instrument was used at one of Jenny Lind's first concerts in America.

HOUSE FOR I. A. BAUM, ESQ., ROCHESTER, N. Y. MR. J. G. CUTLER, ARCHITECT, ROCHESTER, N. Y.

DETAIL OF ENTRANCE TO THE SAME HOUSE.

HOUSE OF H. MURDOCK, ESQ., BROOKLYN, N. Y. MR. C. P. H. GILBERT, ARCHITECT, NEW YORK, N. Y.

TWO SUGGESTIONS FOR HOUSE FRONTS, BY MR. W. E. PASSO.

THE CATHEDRAL, PANAMA, S. A.

The Outlook for the Building Trades.—In an article in *Science*, General M. C. Meigs speaks of what is before architects and builders between now and 1990, as follows: "The probable increase in the ten years from 1930 to 1940 will be about 68,000,000. This is equivalent to 13,600,000 families. Considering only the building trades, this will require the construction in ten years of 14,000,000 new domiciles or family residences. Each will need as much floor and window area as now. Does any one yet foresee the volume of business and its activity, in constructing within a single decade as many buildings as at this time exist within the limits of the United States? What work for architects, contractors, builders, carpenters, masons, brick-layers, plasterers, brickmakers, quarriers, saw-mills, lime-kilns, sand-gatherers, rolling-mills for structural and roofing iron in sheets and beams, for tinners and roofers, and the thousand other trades engaged in construction, not only of the 14,000,000 new homes, but of the markets, stores, warehouses, post-offices, court-houses, city-halls, jails, penitentiaries, etc., necessary in the administration of an additional population equal to all that exists now on the northern continent! What will be the work of providing, and delivering at every house, three meals a day, and every day, for each inhabitant thereof?"

Philadelphia

EFFECT OF THE WEATHER ON BUILDING OPERATIONS.—THE WILLIAMSON TRADE SCHOOL.—THE CITY-HALL TOWER.—EXHIBITION OF THE PENNSYLVANIA SCHOOL OF INDUSTRIAL ART.—THE BABYLONIAN EXPEDITION.

The altogether extraordinary amount of rain that has fallen this season has kept back the work on many important buildings not yet under roof, and has been especially disastrous to the builders and to some of their sub-contractors. The brickmakers have suffered more, perhaps, than any of the others, for thousands of bricks laid out to dry have been washed out of all semblance of shape by the unremitting downpour, and work at the brick-yards has been subject to the most vexatious delays. When one considers that the output of Philadelphia hand-made bricks is more than half-a-million a day, the importance of this loss is easily seen: and the bricklayers have suffered but little less. During one continuous week, what with the slushing of the mortar and the water-soaking of the stacked bricks at the buildings, bricklayers and hod-carriers were unable to work, and contractors helplessly occupied their idle time in calculating the probable amount of their forfeits. The excavation of new cellars, too, has been accompanied by most unusual difficulty, and often only finished with the aid of pumps. Nevertheless, there has been no falling off in the amount of building both going on and projected. In the city itself, more office-buildings and theatres are under way, and more old houses are being either remodelled or torn down to make way for new ones, than usual; while in the suburbs, beside a very fair number of substantial dwelling-houses, it is doubtful if there were ever more schools, homes, reformatories and asylums being built at one time than there are this summer.

There is a new building about to be begun, of which, probably, only the foundations will be finished this year—the Williamson Free School of Mechanical Trades. Five architects were asked, and paid, to compete for this [it may be of interest to the profession to know that, after this fact was published, twenty others volunteered to submit sketches for nothing, and were most properly refused—an instance that goes far to show that the client is not always so black as he is painted, and that the architect is not always the sensitive creature that we expect him to be]; and at a meeting of the Board of Trustees, held on the 23d inst., the design of Messrs. Furness & Evans was accepted and those gentlemen, consequently, selected architects of the school. The buildings will be placed on the southern slope of a hill overlooking the beautiful valley of Glen Riddle, and will comprise a large building for the officers of the school (including a general dining-room and an auditorium) and three workshops, and, to begin with, seven cottages for the boys. This institution—founded by bequest of the late Isaiah V. Williamson—will be rather a supplement than a rival to the trade school, mentioned in a former letter, that the master-builders, with Colonel Auchmuty's generous support, have determined to establish, since in the Williamson School it is proposed to teach the mechanical trades, and not only those allied to building.

When we consider that in the course of a few years these two institutions ought to turn loose on us a lot of skilled American mechanics capable of executing the most finished kinds of building work, it seems a pity that Mr. Koeckkler's legacy to the Philadelphia Chapter, A. I. A., which is to provide for all manner of things that shall conduce "to improving the architecture of buildings in the city of Philadelphia," is not to go into effect for seven years; for in seven years, if architects persist in following the kind of design that seems just now most popular—for example, that of the still unfinished but much-admired bank-building on the site of the old Temple Theatre—there will be very little for the Chapter's future professor of architecture to point out to his pupils but "awful examples." By that time, too, it is be feared that the tower of the Public Buildings may be finished, for the City Controller is to be asked for something more than one million two hundred thousand dollars to be used up next year somewhere about the buildings; and this looks as though the tower, which, at its present stage, is really beautiful, were now to be loaded down with the clumsy mass of cast-iron details that has been designed for its "topping out." However, it will give the Chapter's future professor another "example." As a matter-of-fact, when the Chapter shall begin to receive its half-yearly dividend, it will receive at the same time a very great responsibility, and it will be the imperative duty of the men who care most for the cause of good architecture to see to it that the money is not wasted.

The directors of the Pennsylvania Museum and School of Industrial Art were so much encouraged by the success of the School's exhibition last year that they resolved to hold another, lasting from October 7 to November 18, and on a much larger scale than that of 1888. It is called the Exhibition of American Art Industry of 1889, and includes a competition for American workmen. There will be exhibits of and prizes for pottery, porcelain, glassware, stained

glass, terra-cotta, tiles and mosaic-work. None but Americans will be allowed to compete for prizes. It would, no doubt, be desirable for the success of the exhibition to hold it in the city proper; but so much more space will be needed this year than last (there are almost four times as many exhibitors), that after an exhaustive search no fit place, with the requisite amount and distribution of light, could be found nearer than Memorial Hall in the Park. It has, therefore, been resolved to use this building, more than half the floor-space of which will be given up for the purpose, and the permanent exhibition, meanwhile, moved elsewhere. While the distance from town to the building in the Park is so great that, in spite of the special arrangements that are being made for rapid transportation, the attendance will doubtless be smaller than if the exhibition were on one of the main thoroughfares of the city, the advantages that Memorial Hall presents are manifold. It is, indeed, hard to find a place better adapted to showing exhibits to advantage, and this is especially true of one of the main features, stained-glass. The whole process, by the way, of working in stained-glass will be shown, from the original sketch to the complete window. Mr. LaFarge is understood to have promised some new designs, as well as the Tiffany Company and Mr. Crowninshield; in fact, most, if not all, the best-known designers. The committee expect, with reason, that this will be by all odds the best display of stained glass ever made in this country. The part devoted to glassware also promises well, at least in quantity; and the mosaic exhibit, although one can almost certainly predict that the best of it will not be by American hands, ought to be a very interesting feature. This kind of decoration is so cheap, so durable, and, as a rule, in such quiet, pleasant tones, that it is not surprising to see it coming more and more into general use. The terra-cotta display will in all probability be a pretty large one. There are prizes offered for the best vase, capital, caryatid, or other detached object, and for the best panel, frieze or spandrel, beside the usual prizes for the best general exhibits. The list of prizes for the pottery and porcelain section is very long, and includes a good many in which success will depend on merit of design quite as much as on skilful manipulation and burning. This is also the case in some of the prizes for tiles — a department that promises, thus far, very well indeed. It is quite probable that the School will add to its list next year an exhibition of metal-work, an art in the development of which America has amply done her share.

The University of Pennsylvania has just cause to congratulate itself on the success of the first year's work of the Babylonian Expedition sent out under its auspices last summer. The object of the expedition is to explore the country watered by the lower Tigris and Euphrates. One of the chief reasons why this region, so abundant in monuments of the highest historical and architectural interest, has been heretofore comparatively unknown to archæologists, has been the uniform hostility of the Turkish Government to any proposed exploration. The *Public Ledger* of this city, from whose columns many of the following facts have been gleaned, is authority for the statement that, although France and England have made repeated requests on behalf of their scholars for similar expeditions, they have always — at least, since the French expedition of 1852 — been refused; whereas the United States, through the efforts of our new consulate at Bagdad, had their request granted with gratifying quickness. Once on the ground, however, or on the edge of it, it appears that the American expedition was subjected to the most vexatious delays. The Turkish Government seemed in no hurry to ratify its agreement. The members of the expedition, not daunted by having been shipwrecked in the Mediterranean, where they lost many of their instruments, were somewhat discouraged by this indefinite delay. After eight or nine weeks of tiresome waiting, however, and as the rainy season was approaching, they were allowed to begin work. Practically, they have not had more than seven working months up to this time, for the rainy season means complete inundation of the country, but in that time have been unearthed about three thousand tablets. These tablets are of sunburned clay, and range in date from 1500 B. C. to about 3750 B. C. Most of them were found in the town of Nipparu, which, until the expedition got its four hundred Arabs at the work of excavating, was merely a huge mound on the edge of a marsh, with jackals, hyenas and gazelles for its only inhabitants. The immediate discovery of numberless coffins proved that the explorers were on the site of the old cemetery. This cemetery has been found so large that it is pretty definitely concluded to have been, as it were, a national burying-ground. There are near this cemetery, but separated from it by what was probably a canal, two smaller mounds, and it is to the exploration of these last that the explorers are looking forward with impatience. These are supposed to be: one, the site of the temple of Bel, and the other the city proper. The mound that is supposed to cover the ancient temple — known to be a four-story structure — is more than one hundred feet above the level of the plain, and the foundations of the temple have been found to be twenty-five feet below this level. Beside a large proportion of the tablets already spoken of, many of which are inscribed with records of immense historic value, there have been discovered in this mound several large bas-reliefs and a number of friezes, which, in accordance with the original agreement under which the exploring party was fitted out, are to go to the University, as custodian of any works of art that might be found. A special part of the still unfinished library building has been reserved for this collection, of which the best of the bas-reliefs will be let into the venetian-red background of the walls. From all appearances, there will be need of more space next year to accommodate the expected increase of the collection, for the explorers regard the result of this year's work mainly in the light of a successful survey of a region that promises far richer treasures than any it has already yielded.



THE NEWBERRY LIBRARY. — THE EFFORTS MAKING TO SECURE THE WORLD'S FAIR. — IRON VIADUCTS. — MOVING A LARGE BUILDING. — A CHILD'S PLAY-HOUSE.

THE past month seems to have been unusually quiet and uneventful in the architectural world here, so that there is little but professional gossip to be chronicled.

The construction of two very large commercial buildings has, indeed, been actually commenced, but, except as a study of foundations, they are at present decidedly uninteresting. Several other large building projects that were announced some time ago have made but little progress, while of our only important semi-public building, the Newberry Library, the public is vouchsafed no very definite information. The library is the one that has an endowment of several million of dollars, and of which the architect was appointed over a year ago, as noted at that time in these letters. The architect is now credited with the statement that only three persons, the two trustees and himself, know what the plans are to be. Why such profound secrecy is necessary in a building of this character is scarcely apparent; and, moreover, if the fact is, as the newspapers state, it cannot but be a matter of surprise that the librarian has not been consulted, since he seems to be recognized as probably the best posted man on libraries in the United States. If however, as would now appear, his opinions are not to be asked and followed, it will certainly not be very greatly to the credit of the trustees who surely do not make pretense to any special knowledge as regards libraries and library needs.

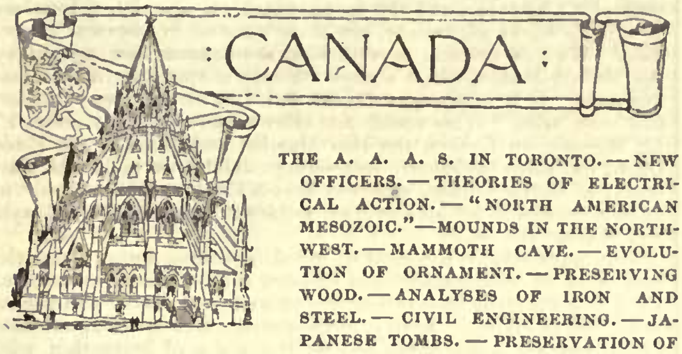
In a mild way, the whole city is, as a matter of course, agitated on the subject of the World's Fair in 1892. As for the ninety-and-nine (more or less) reasons why the fair should be held in Chicago, and nowhere else, all are respectfully referred to any of the Chicago daily newspapers, where the particular advantages of central location, summer-resort climate, genuine American civilization, hotels, railroads, etc., can be studied up at leisure. At any rate, the very important factor of a huge popular subscription has (in contradistinction to the New York style) been so systematically and successfully carried out, and so general a popular endorsement obtained from the entire West and many portions of the South, that the utmost confidence is felt that, as usual, Chicago's energy and liberality will be rewarded.

Under a general committee, sub-committees without number have been at work. Each trade and profession has been canvassed by prominent members of these bodies. As would have been expected, the architects do not appear to have been as enthusiastic as those directly engaged in commercial affairs; nevertheless, they have subscribed quite generally, although in not very large individual sums. Should the great fair come here, undoubtedly a few architects and engineers would be greatly benefited, but the majority of the profession seems to have doubts as to any great general good that they, as a body, would obtain, although some sanguine members insist that each and every architect would see his work increased thirty per cent from the moment the location was definitely fixed at Chicago. Already several minor schemes of interest are under consideration, and committees working upon them: among others is the idea of having a special opera written by Gounod, based upon incidents in the life of Columbus; this opera to be given during the exhibition in the new Auditorium hall. A statue of Queen Isabella, and probably one of Columbus, would be erected by parties and societies not directly connected with the exhibition. The fact is, about as the popular papers express it, that Chicago is "hustling," and is prepared to move upon Congress with the solid cash in hand, and backed by the energy of the whole West.

Among the public improvements going are several fine iron viaducts over different railroad tracks, and the one at Twelfth Street, which has now been building for two years, is at present nearly completed, having a total length of about a mile. For the past two months the approaches at the East End have been in course of construction, necessitating the destroying of several buildings. On State Street, exactly in the path of this approach, was a five-story brick and stone building containing five stores, and having an area of about 100 x 125 feet. It was too good a building to destroy, so a small army of men were set to work, and it was raised by jack-screws, and blocked up on timbers, until a heavy wooden timbering could be placed under it, similar to the runners of a sled — these runners being possibly six feet apart. The whole building was then let down upon another timber construction arranged as a track. This runway was covered with wax, and by working a large number of jack-screws, placed horizontally, and braced against the street

retaining-wall, the whole building was slowly moved south, nearly a hundred feet. The old building is now once more upon screws, and is having a new foundation built under it, so that it will soon be firmly established in its new locality. Although the building was estimated at 8,000 tons weight, there seems to have been no serious cracks or injury, and, indeed, several families did not move out during the entire operation, though they must have suffered very considerable inconvenience on account of the disturbing of sewer, water and gas connections.

Certainly no private residence recently erected has been such an object of curiosity, and been daily watched by such a wondering crowd as a toy play-house just built by a resident of the North Side for his little daughter. The construction is said to have cost about $2,500, and, although it cannot boast of any architectural effect unless towers and galvanized-iron are such, yet it has been illustrated in the daily papers and written up more fully than any recent house in the city. The furnishing of the different rooms has been described in detail, while the water-supply and other sanitary points have been more gravely described than the healthy conditions of hundreds of our tenement-houses in the slums.



THE A. A. A. S. IN TORONTO. — NEW OFFICERS. — THEORIES OF ELECTRICAL ACTION. — "NORTH AMERICAN MESOZOIC." — MOUNDS IN THE NORTHWEST. — MAMMOTH CAVE. — EVOLUTION OF ORNAMENT. — PRESERVING WOOD. — ANALYSES OF IRON AND STEEL. — CIVIL ENGINEERING. — JAPANESE TOMBS. — PRESERVATION OF MONUMENTS.

THERE can be no subject for this month's Canadian letter of more general interest than the meeting of the American Association for the Advancement of Science in Toronto. The thirty-ninth annual session has just been completed, and it was to this city, in response to a very hearty invitation, that the Association repaired at the end of last month. This is the third time that a session has been held in Canada, and it afforded the members no little pleasure in exchanging ideas with Canada's men of science; and the reception accorded them was, according to their own verdict, the finest of the thirty-nine, "with the exception only of Boston" (comparisons are not pleasant, and we feel we should like to know wherein Boston excelled Toronto, but that is, by the way), our guests at any rate appeared to be thoroughly satisfied. The first day was devoted principally to general business, the election of officers, arrangements of meetings, striking committees, election of new members, and so on, and the Association settled down rapidly and steadily to work.

The new President is Professor Mendenhall, of Washington. Mr. H. C. Bolton, New York, was elected Secretary in the place of Mr. Frank Baker, of Washington, absent. The Vice-President of Section D was also unavoidably absent, and Prof. J. Denton, of Stevens Institute, Hoboken, N. J., took his place. The retiring President was Major Powell, of Washington. The Secretary, Prof. Putnam, announced the election of fifty-two new members, making a total of one hundred and seventy-three this session.

During the week of the session we seem to have been in a perfect whirlwind of science. Over a couple of hundred papers were presented, touching at greater or less length on pretty nearly every topic under the sun — on science, art and history, facts and theories, ascertained and speculative, and it is a little difficult to collect one's thoughts and arrange one's ideas so as to give an account of those papers of particular interest to the readers of the *American Architect.*

The greatest subject of the present day, and that which was treated upon more fully than any other, is "Electricity," and Prof. H. S. Carhart read a long and exhaustive paper on "Theories of Electrical Action." After remarking upon the universal interest taken in the subject, and showing how the development of electric science affects everybody, he entered upon the theories of its action, and concluded with the following deductions: "Electro-magnetic waves are not only like light, but they are light; or, to put it more fully, all radiant energy is transmitted as electro-magnetic waves in the luminiferous ether. Electricity has thus annexed the entire domain of light and radiant heat, and has become a truly imperial realm. Long waves from an alternating current represent energy. Through space it is conveyed with the velocity of light, and through other non-conductors, dialectrics, with a smaller velocity, precisely as in the case of the radiant energy of light and heat. Henceforth the complete equation for the distribution of energy by means of alternating currents must include a term to express the radiation from the circuit. It may, indeed, be found that this term represents no inconsiderable part of the energy communicated to the wire in the case of very rapid alternations. The language applied to electrical phenomena must, in the future, always include as a prominent term, the luminiferous ether. The experiments of Hertz have made it impossible to explain electrical facts without taking this invisible medium into account. There is no such thing as electrical or magnetic action at a distance. As the ear responds to the slow oscillations of an electrical discharge, through the intermediate agency of heat, so the eye of the mind responds to those more rapid oscillations, the existence of which has been demonstrated by experiment. No less clearly does the magnetic field appear as a system of lines of stress in the ambient ether. But definiteness has taken the place of the metaphysical speculations of earlier times. Complete ignorance has, at least, been superseded by half knowledge. We may not yet affirm that the ether is electricity, but we are, doubtless, nearer a solution of this old problem than ever before."

An interesting paper in the geological and geographical section was read by Professor White, of Washington, on the "North American Mesozoic." He told us that on the Atlantic coast the rocks now generally regarded as of Triassic age, are found occupying limited isolated districts from Prince Edward Island on the north to the State of South Carolina on the south. If they extend farther in the same direction, they are covered by later formations. In Prince Edward Island they are found resting conformably upon reputed permian strata, which is exceptionable, as elsewhere they rest unconformably upon various formations, from the archæan to the carboniferous strata. The character of this mesozoic was very fully described, and it would appear that in North America, in later mesozoic times, a higher stage of development with relation to animal life was exhibited than in Europe; and the difference in grade among the now living indigenous fauna of the different continents, respectively, indicates that a similar difference in the rate of development has also prevailed in different divisions of the animal kingdom.

In the anthropological section Professor Bryce, of Winnipeg, lectured on "The Winnipeg Mound Region" being the most northerly district on the American continent where mounds have been examined. Mr. Bryce examined a region some 400 miles east to west, and running from the international boundary line northward; the most northern mound being seen in about 52° north latitude. Out of some sixty mounds he opened ten in connection with the Manitoba Historical and Scientific Society. Numerous skeletons where exhumed, and one skull (exhibited) was distinctly krathycephalic. Charcoal, red and yellow ochre, and charred birch bark were found in great quantities; and articles of daily use, such as tools, personal ornaments, stone implements, a set of gaming stones, bones, whistles, shells. All the mounds are circular, and situated on prominent headlands. The majority of skeletons were probably of Mandans of the Missouri, who were almost exterminated by small-pox fifty years ago. Some of the mounds dated back as far as 400 years.

While on this subject, I may mention a paper by the Rev. H. C. Hovey, of the *Scientific American.* The subject, which has been a special study of Mr. Hovey's, was the "Mammoth Cave." As is well-known the cave is arranged in several tiers or galleries, through which chasms have been cut by rushing water. Mr. Hovey was the first visitor to follow the guide across a treacherous chasm known as the "covered pit," beyond which he found a series of pits exceeding in size any that have ever been discovered in any part of the world. He was not prepared with means for taking measurements, but in last April he sent Mr. Ben. Harris, a photographer, to visit the pits and make a thorough investigation. Mr. Harrison measured the whole series, and found them to vary from 47 feet to 135 feet deep. Through a crevice he got to the bottom of the deepest, and there discovered that the entire series of pits, eight in all, are connected at the bottom with a magnificent cave or hall said to be several hundred feet long.

Mr. W. H. Holmes, of the United States Bureau of Ethnology, took for his subject "The Evolution of Ornament — the American lesson." "American art furnishes a large body of data, which deserves careful consideration. This is especially true, since the primitive character of aboriginal art renders its use in the study of questions of evolution comparatively easy." In this paper, the development of certain well-known conventional designs were treated. "Two arts — the textile and the ceramic — are found to be almost exclusively concerned. Elements of decoration enter these two arts in two great currents, one of which carries mechanical, and the other graphic, elements. When once within the realm of decoration, these elements are subject to the realm of two great forces — the æsthetic desires of the mind and the technical or mechanical agencies of the art. In the textile arts these agencies are very pronounced, and it is easily shown that through their action all forms, mechanical and graphic, tend to assume the linear or geometric character. Arts of a more or less graphic or plastic nature act in their own ways to produce corresponding results. It is seen that strong resistance to this tendency of the arts to reduce all graphic forms to the purely geometric is offered by the association of ideas with the delineations. We have here the conservative force of art, which, in order to express ideas clearly, holds tenaciously to the first form of expression — the graphic."

On "Preserving Wood Against Decay," Mr. Chanute, of Chicago, said that at least four methods had proved successful: (1) Kyanizing, or preserving with corrosive sublimate; (2) copperizing with sulphate of copper; (3) burnettizing with chloride of zinc; and (4) creosoting with dead oil of coal-tar. The first two methods are gradually falling into disuse, and, of the latter, creosoting is the most

effective. Cross-grained timber, such as white oak or chestnut, should not be treated at all; but more porous woods, as hemlock, bastard pine and beech, will take the treatment well, and the wood will last twice as long.

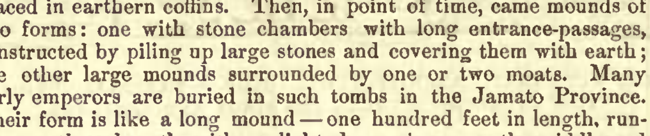
Mr. Langley, of Pittsburgh, read a paper on the "International Standards for the Analyses of Iron and Steel." He stated that a system of international standards had been arranged between England, France, Germany, Sweden and the United States. He gave a description of the system, and asked for the appointment by the committee of one chemist, to act with six others, to conduct the analysis on behalf of the American committee, and to coöperate with the European analysts. Mr. Thomas Brown, of Boston, was appointed, with Prof. F. A. Gooch, of Yale College, New Haven, Conn., as alternative.

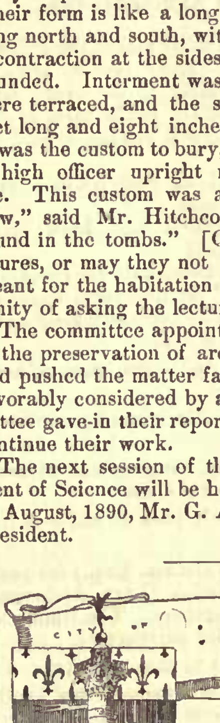
"The Economic Conditions of Long-Span Bridges, with Special Reference to the Proposed North River Bridge at New York City," was a paper by Gustav Lindenthal, Civil Engineer, Pittsburgh and Baltimore. After a general introduction and historical allusion to the development of bridge-building, there was an interesting discussion on the most suitable types of bridges for long spans, with reference to certain local conditions. Methods of calculating strains, materials, and economic forms of materials were discussed, and the great economy of using steel instead of iron was shown. The effect of temperature upon the metal, particularly in suspension bridges, and wind effects, were dwelt upon for the purpose of showing how the bridge type for the proposed North River bridge was selected. The guiding features of this bridge were then described and its dimensions given, but, as they have appeared in a former number of this paper, I will omit them for the sake of economizing space.

There was a paper by Mr. Hitchcock on "Ancient Japanese Tombs," giving the history of funeral customs in that country. "The most ancient form was a simple mound of earth, the body being, perhaps, placed in a wooden coffin. Cave-burial was also practised, caves being hewn out the rock, and here the dead were placed in earthern coffins. Then, in point of time, came mounds of two forms: one with stone chambers with long entrance-passages, constructed by piling up large stones and covering them with earth; the other large mounds surrounded by one or two moats. Many early emperors are buried in such tombs in the Jamato Province. Their form is like a long mound — one hundred feet in length, running north and south, with a slight depression near the middle and a contraction at the sides. The south end is square, the north end rounded. Interment was near the top of the north end. The sides were terraced, and the soil supported by clay cylinders about two feet long and eight inches or one foot in diameter. In early times it was the custom to bury, up to the neck, persons in attendance upon a high officer upright round his grave alive, and leave them to die. This custom was abolished and clay figures substituted, and now," said Mr. Hitchcock, "very strange figures are occasionally found in the tombs." [Question: Is this really the origin of these figures, or may they not be something akin to the Egyptian figures meant for the habitation of the spirit of the dead? I had no opportunity of asking the lecturer.]

The committee appointed to memorialize Congress on the subject of the preservation of archæological monuments on the public lands had pushed the matter favorably through one house, and it had been favorably considered by a committee of the other house. This committee gave-in their report among many others, and were requested to continue their work.

The next session of the American Association for the Advancement of Science will be held at Indianapolis on the third Wednesday of August, 1890, Mr. G. A. Goodall, Cambridge, Mass., being elected President.





HEATING APPARATUS. — TAPESTRY AND HANGINGS.

TO-DAY we will go through the industrial section of France, and note still the things which are connected with architecture or the decorative arts, although in a less direct manner. I wish to speak of tapestries, decorations and French stoves. As to Class 27, consecrated to heating apparatus, it includes all possible kinds of models of fireplaces, stoves, heaters, etc. I have already had occasion to say how the greater part of these apparatus called "economical" are still defective, in spite of the improvements which every day attempts to incorporate with them, since the time of the one invented by Dr. Choubcrski, the first of its kind — a little out of style to-day in favor of the Cadé stove and the "Salamander," the principal good qualities of which are their having a visible fire and better-regulated draught.

By the side of these fireplaces and domestic stoves we find, in Class 27, the apparatus for ventilation and heating by hot-water, steam and warm air, manufactured by Messrs. Anthonay, Cuan, Geneste and Herscher, of whom we will speak more at length in connection with the special exhibit of these last gentlemen upon the esplanade of the Invalides. Independently of these entirely serious apparatus, I may mention the pretty stoves and fireplaces in *faience* by Picquefeu and by Lœbnitz, who, amongst other things, exhibit a stove arranged in imitation of the old stoves of Nuremburg, the principal pieces of which have been made in the same seventeenth-century moulds. Some of these moulds are shown in the exhibit of the History of Labor in the Palace of the Liberal Arts.

Before leaving this class, I will mention, by way of curiosity, a new invention of Dr. Chouberski, about which there is much discussion. It is a toilet commode. The apparatus pretends, externally, to be a cabinet with mirror of ordinary size. Internally, we find douche-jets of every kind, and the wherewithal to bathe one's self from head to feet — with two gallons only of water. The apparatus is evidently ingenious, but its small size, given all the ends it aims to achieve, seems to me to offer a feeble guaranty of practical results.

The tapestry decorators, who occupy a surface of about 2,600 square metres, show us the different ways of arranging a baldacchino and of draping stuffs and curtains. Shall I say that these are generally tormented, and the tapestry-makers, who dub themselves decorators with such facility, are often wanting in taste and discretion? We can remark, nevertheless, the bedchamber exposed by the Maison Jansen, which always attracts a crowd by its virginal freshness. It is so pretty, so clean and fine, so delicate, so tender, that one asks, "Who could properly inhabit such a chamber?" Le Magazin du Louvre, the Bon Marché, and those in the Place Clichy have also sufficiently interesting exhibits, as well as M. Parfoury, a marble-worker, who has sent a dressing-table entirely of marble, composed by M. Cuvillier, architect, which is of good style and of great richness.

Very interesting is the class of upholstery, an industry where the perfection of workmanship has effected considerable amelioration. Until now our recognized superiority existed particularly with regard to articles of luxury. To-day, in the manufacture of cheap mechanical contrivances we have reached the stage of competing with foreigners.

In design and color the present mode affects the Oriental style. We find in Class 21 models of Persian and Smyrna carpets of great richness. One of the most interesting exhibits is that of the Maison Sallandrouze Bros., of Aubusson, who show us carpets in every style and of all kinds, made by machinery at little cost, although having a very rich and decorative effect. MM. Croc, father and sons, exhibit a very beautiful Jacquard moquette carpet of great fineness of design and color. The Oriental and Persian carpets of the Maison Louillat, at Aubusson, are at once very thick and of remarkable suppleness, the designs are well-studied and the color warm.

The tissues of M. Catteau, rich embroideries in the Oriental and Renaissance style, must also be mentioned, and those of the Maison Edouard Bernaux, Defrennes, Duplong, Hordé and Simon (formerly Tresca), who exhibit interesting reproductions of ancient tapestry, woven in the Jacquard loom, and the Savonnerie *à points noués* of M. Gache & Co., a large fragment of fine design. The Maison Hamot has applied itself especially to the reproduction of the paintings of the masters. It is thus that they show us the "Cascade," after Mazerolles, a difficult example to accomplish in the loom; "The Target," after Boucher; "The Bath of Psyche and Cupid," after J. Romain; "Autumn," after Lebrun; then different carpets and Louis XV furniture, a carpet from the Savonnerie, and two very curious reproductions of Persian carpets from the Goupil collection in silk and wool, with inscriptions in silver. The Maison Braquenié also shows reproductions of paintings by Rubens, Ehrman, Fragonard; tapestries on a silk background after Oudry, Savonneries, and "The Twelve Months," after Audran. But all of these reproductions, curious *tours de force* and difficult of accomplishment, are false applications of a kind of decoration and ornamentation which is not adapted to tapestry, and which, consequently, is not suitable for it.

Decorative, in another way, are the carpets and hangings of M. Ferdinand Leborgne of Lannoy (Nord), who succeeds in making, at very lost cost, as compared with the cost in their native country, models of Oriental tapestry of the richest colors and most fantastic designs. Two specimens, six metres high and three metres wide, decorate the doorway separating Class 21 from the Egyptian bazaar, and attract attention by their joyous air and their brilliancy. M. Leborgne is the first who had the idea, and found the means, of utilizing jute as a textile fibre for furniture-covering. He shows some samples of it, which, thanks to the improvements effected since 1878, have an air of elegance and a very decorative effect, and this at very modest cost.

In the jewelry class we must particularly remark two altars which are exhibited in the central gallery — the high-altar for St. Ouen, at Rouen, executed by the Maison Poussielgue-Rusand, after the design of M. Sauvageot, and the high-altar for the cathedral at Rouen, by the same author, and executed by the Maison Trioullier. For my part, I like the second best, in stone and gilded bronze, as being the more architectural; but the other, of all bronze, is perhaps more carefully executed as a piece of jewelry-work. M. Poussielgue-Rusand also exhibits in Class 24, bits of religious jewelry, of remarkable execution; but in this order of ideas, there is, perforce, little progress in the form of shrines, reliquaries, ossuaries, chalices,

etc., which are always inspired after some old models. It is in domestic jewelry that we must look for progress and new tendencies. In a general way this can be reproached with being a little too much studied, but we must acknowledge that great ability in the way of execution is exhibited in this room. Other jewellers seem to seek their inspiration most often in the style of the eighteenth century, and some make excursions into the field of Japanese design. The most interesting things shown are those by MM. Christofle, Froment, Meurice, Odiot, etc. M. Brincourt.

JEAN PAUL AUBÉ.[1] — III.



AT the *Salon* of 1885, Aubé exposed a plaster statue, larger than life, of General Joubert, killed at the battle of Novi, in 1799. Joubert was one of the hundreds of fiery and brave warriors with whom France has so gorgeously decorated the pages of her military history. He was named general at the age of twenty-six, on the field of the battle of Loano. On the plains of Lodi, in 1799, he was surprised by an attack by Souwaroff, the famous Russian General. Seeing some regiments about to retreat before overwhelming numbers, he galloped towards them with a few cavalry, caused them to halt, by his animated words, and again to face the enemy. At this moment a ball struck his heart, and he had just time enough, before he fell dead, to cry out, "Go ahead! Go ahead, and always. Drag me one side and cover me up, so that the Russians will not find me, and will think that I am always with you."

The statue represents the General at the battle of Rivoli, 1797, when, seeing his grenadiers falter, he jumped from his horse, that had at that moment been killed, seized the gun of a dead soldier, and pointing to the enemy, cried out in inspiring tones, "Advance, my comrades! Advance!" and thus led them to "one of Bonaparte's most beautiful victories."

The appearance of the "Joubert" seemed to be an excellent occasion for a fuller expression of Aubé's merits than had hitherto occurred, and it was readily taken advantage of. He was now, not only the author of several excellent statues, the winner in the great Gambetta monument contest, but a sculptor requiring the proper amount of professional analysis.

"The Joubert is simply the masterpiece of the *Salon*, a model of truth and harmony of movement. No one is more Attic than Aubé, and none better than he can find the just note of the *Beautiful*. Equally apart from academic dryness and extreme naturalism he proves himself to be a perfect eclectic. His Joubert is the highest and purest expression of modern art. Noble tranquility of line, perfect harmony of parts, and above all movement, life, passion. It is the kind of sculpture that will influence, by its genius, our future sculptors." The *Revue des Beaux Arts* spoke as follows: "In the hot battle that is being carried on between the school and the independents, Aubé has been enabled by his fine mind to place himself simply on the side of good taste.

"His nature, made up of fineness and clairvoyance, delicately balanced, has kept him away from the weaknesses of the one and the imperfections of the other. He lives in an art atmosphere that will take care of itself. His delicate modelling, exquisite to a degree, is put to the service of serenity. His Dante, his Bailly, his Shakespeare, are finished works, and reveal an artist preoccupied by the beautiful in the grand.

"The Joubert contains the distinction and power already indicated in his previous compositions. The general is full of fire. He marches without fear, without effort, without theatrical pose, to victory or death.

"His heroism is natural, without too much emphasis, and ready in gesture. You feel that he is a brave man accustomed to war, a chief who is obeyed and who has simply to raise a finger to lead his soldiers. Joubert remembers that he has been a common soldier; and gloved as a general, he picks up the gun of a veteran to serve as the baton of a commander. He goes straight at the enemy, sure of vanquishing him. Aubé has traced the history of the hero in excellent terms, in a style sober and clear, as confirmed by facts.

"The modelling is extremely close; the large planes have a firm severity; the general aspect has perfect ease, and the expression is living and noble. No stiffness in the action; no constraint in the attitude; no exaggeration in the traits of the physiognomy. All takes care of itself; all is firm; all moves. This statue has nothing earthly about it, and the talent of the artist itself rides above the earth."

The *Revue des deux Mondes* contained a similar article, and all the critics, without exception, praised the statue, some of them adding that the works of the sculptor placed him fairly among the best of his contemporaries. Another trait of Aubé's, early noticed by writers, besides that already mentioned, that he was looking after the Beautiful in its larger aspects, was, that his modelling was "different from that followed by the School, and appeared to be the expression of an independent mind which was searching deeply in the way of personal development."

The "Joubert" was erected at Bourg, department of Ain, with extraordinary military and civil ceremonies. The event aroused so much interest that hardly a newspaper in all France failed to contain an account of the statue and its inauguration, the sculptor receiving his share of the honors.

In the *Salon* of 1888, Aubé exhibited a large plaster statue of Boucher, the painter. Many artists considered it as the best piece of sculpture in the Exhibition, and a remarkable interpretation of the character of the subject. It was bought by the State, though it received no recompense whatever from the jury. More than ever it made little difference to the sculptor, for his great work on the Gambetta monument was completed and in the hands of the bronze founder, and he could wait until he received from his Government a higher recognition, that known as a Knight of the Legion of Honor.

T. H. Bartlett.

(To be continued.)

[1] Continued from No. 715, page 116.

SOCIETIES

THE CINCINNATI ARCHITECTURAL CLUB. — NATIONAL EXHIBITION OF ARCHITECTURAL DRAWINGS AND SKETCHES.

THE Cincinnati Architectural Club respectfully makes the following announcement: — Recognizing the great benefit arising from an exhibition of the above character to the craft, and desirous of creating a healthy improvement in the public taste as regards architecture, this collecting of architectural studies is undertaken.

This exhibition will embrace the work of all Sketch-Clubs and prominent draughtsmen in America and Canada.

Ample wall-space and an excellently lighted hall have been secured; two most important factors for success.

As the exhibition is to be National, and consequently far-reaching in its character, the kindly co-operation of all Architectural Clubs is cordially solicited. In the sincere hope that this necessary assistance will not be withheld, the following statement is made:

Works Exhibited. — Water-color studies, India ink, pen-and-ink sketches, perspectives.

When to send. — All exhibits must be in Cincinnati by not later than November 10th.

Transportation. — The cost of transporting, hanging, and returning will be borne by the Cincinnati Architectural Club.

How to send. — All sketches must be properly packed, and sent by express.

Prizes. — Hinkle Gold Medal, (A. Howard Hinkle, Esq.,) for best exhibit of club work. Anderson Silver Medal, (Larz Anderson, Esq.,) for best individual work among club members. The Builders' Exchange will offer a medal for best water-color perspective.

Jury. — Three prominent architects will act in this capacity.

Catalogue. — There will be an illustrated catalogue issued, with selected prize club designs, these designs to be in pen-and-ink.

Time and Place. — The exhibition opens November 19, continuing one week, and will be held in Pike's Opera House.

Further information will be cheerfully given, and all letters of inquiry are to be addressed to John Zettel, Secretary, Room 81, 227 Main Street, Cincinnati. The schedule enclosed is to be filled up as promptly as possible and returned as directed.

Again inviting your valued assistance, I am respectfully,

G. W. E. Field, *President,* C. A. C.

Patrons: A. T. Goshorn, A. Howard Hinkle, Larz Anderson, M. Louise McLaughlin, Clara C. Newton.

COMMITTEES.

Finance: John Zettel, A. Stedman, G. W. E. Field. Advertising and Catalogue: L. Mendenhall, L. G. Dittoe, D. Davis, A. Stedman. Decoration and Hanging: A. O. Elzner, F. Winkleman, E. Moorman, M. Heister, H. C. Chaney. Correspondence and Soliciting: John Zettel, G. W. E. Field, L. Plympton. Music and Reception: L. G. Dittoe, H. C. Carrel, Thornton Fitzhugh, John Zettel, A. Stedman, J. P. Striker.

COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by

PROPOSED NEW JERSEY SKETCH-CLUB.

Montclair, N. J., August 29, 1889.

To the Editors of the American Architect:—

Dear Sirs,— Will you please consider the proposition to invite the draughtsmen of Newark, N. J., who desire to form a sketching-club, to send their names directed to "New Jersey T-Square," in care ot your office? The intention is to commence this fall. By giving this movement your consideration you will oblige

The Draughtsmen.

[We will willingly forward to the proper address any communication we may receive.—Eds. American Architect.]

NOTES & CLIPPINGS

English Artists of 1800 not "Old Masters."—The Treasury Department has declined to grant the request of Henry Marquand, of New York, for a modification of the decision relative to the importation of collections of antiquities. The correspondent wished the decision (which defined such works "as those produced before the year 1700") modified so as to admit free the paintings of Reynolds, Gainsborough, and other artists who lived about the year 1800, and recognized by the British Museum as "old masters." The Department, however, holds that these works are not antiquities in any proper sense of the term, and that such a radical modification as that sought can be made only by act of Congress.—*Exchange.*

The Use of Lime to remove Frost.—The high temperature produced during the slaking of lime has been but rarely utilized, except as an agent in matters of accident in setting fire to vessels and to buildings. We may add to these the ordinary method of the helpers to masons, who warm up the coffee for their dinner in cold weather by placing the pail of coffee on a lump of lime, sprinkling on a little water, and watching it carefully to see that it does not boil too hard. Many years ago, before the invention of the diving-bell, a large wager was made between two gentlemen in regard to the possibility of one's cooking a pudding at the bottom of the Thames. The winner had his pudding placed in the middle of a large sack of lime, lowered to the bottom of the river, and in due time pulled up, with the result of finding that the conditions of the wager, in regard to the cooking of the pudding, had been fully carried out. But of late lime has been frequently used to remove the frost from the ground in winter, and also to melt out water-pipes, as it has been found that a heap of lime laid on the earth, wet slightly, and covered over with blankets and other non-conducting materials, will draw the frost out of the ground.—*Engineering.*

Trees Growing on Towers.—Greensburg, Indiana, has long been noted by the singular phenomenon of trees growing on the court-house tower. The first tree made its appearance in 1864, a tiny green shoot on top of the tower, and was the cause of much wonder and interest. Its development was eagerly watched, and, as its steady growth continued, became known as the Lone Tree. A year passed, the little tree assumed greater and more graceful proportions, and flourished in spite of its lofty position, exposed to wind and storm. Other trees have since made their appearance on different sides of the tower, until there are seven. While making the repairs on the court-house, now in progress, scaffolding was built around the tower, and the largest tree was reported to be six and one-half inches in circumference and five feet ten inches high. No damage was being done by them, and it was decided to allow them to remain, as the crevices in the stone roofing made by the roots of the trees show an opening of only one and one-quarter inches. The tower is 123 feet high, of solid masonry, and how the trees find nourishment to sustain them is a matter of great wonder—*Boston Transcript.*

Growing out of the masonry of the French Catholic Church steeple in Biddeford, almost at the upper limit of the brick-work, are two young trees. One is upon the side of the steeple facing down Elm Street, and the other is upon the opposite side. They are so high in the air that they look much smaller than they really are, and probably very few who pass the church notice them. Yet masons who are able to make comparisons by a knowledge of distances between points upon the spire, say that the tree upon the South side of the steeple is fully eight feet tall and the other about six. Both are green and healthy looking and have grown rapidly within a year. They are beyond reach from the upper window and could not be removed without a stage being built. The opinion is that one is a willow and the other a poplar. How they obtained root in the masonry is a mystery.—*Portland Press.*

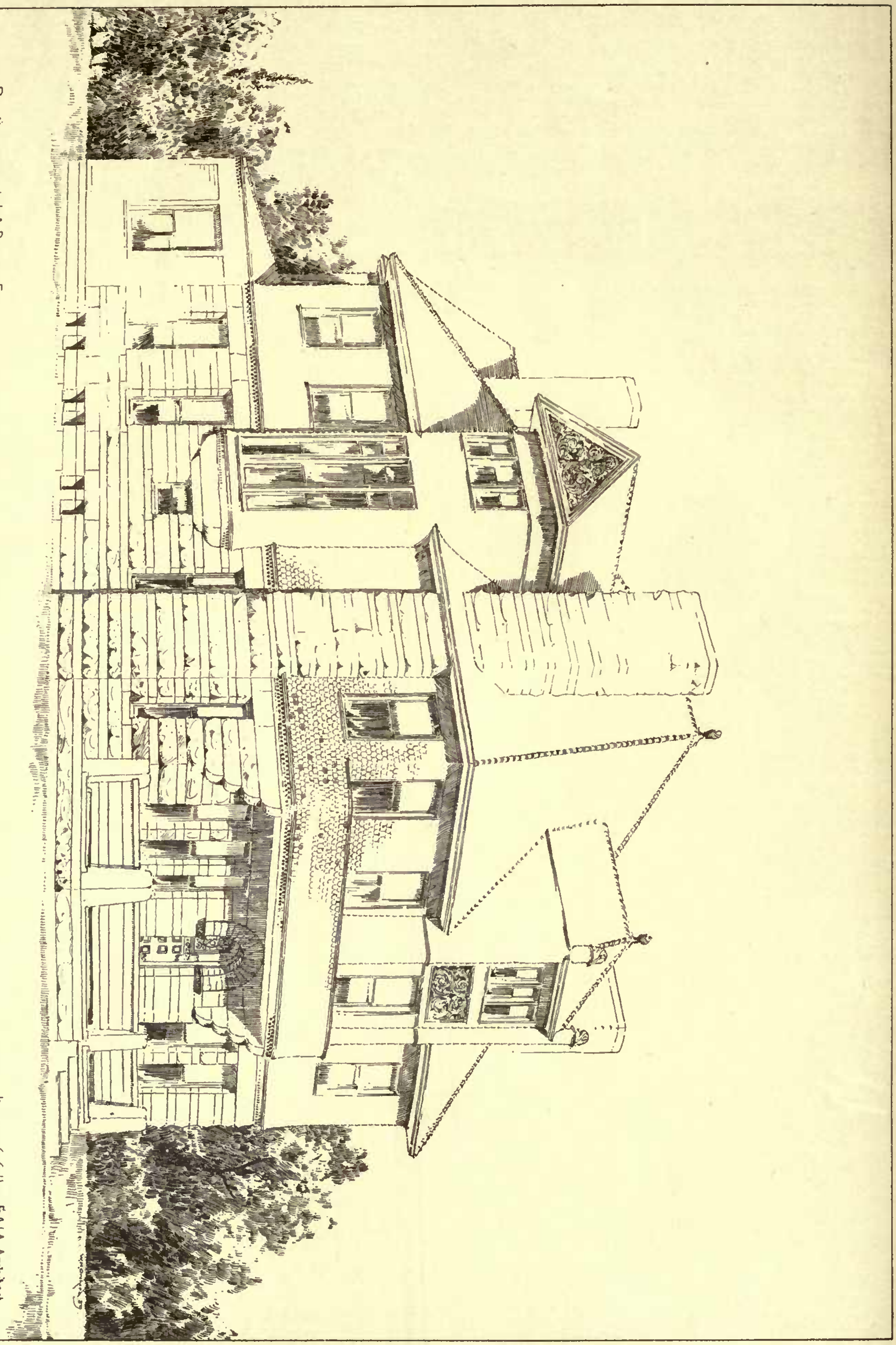
An Elevated Exhibition Building.—An architect and an engineer, Burr Ferree and L. Howard by name, propose to the World's Fair committee an elaborate scheme for the erection of an iron and steel structure in the heart of the city, to cover 60 acres. According to the plan of the two writers, a series of wrought iron or steel lattice arches would be thrown over the houses from Sixty-sixth to Sixty-seventh to Sixty-eighth Streets, and so on at sufficient intervals to distribute the weight. The different series of arches would be braced and stayed, each with the other, and the intervening space supported by cantilevers. The feet of the arches would be constructed after the form of an A-frame, thereby permitting unobstructed traffic in the streets. The structure, it is urged, would be light and graceful, and could be floored with iron and coated with asbestos, as a protection against fire from below. Upon this would be built a superstructure in three tiers or floors of glass and iron throughout. Each tier would be devoted to a particular kind of exhibit: machinery and agriculture on the lower tier, industrial products on the second, and art and horticulture on the upper. Access to the building would be by pneumatic elevators. The whole design, with its broad, inclined planes rising from the water's edge, with its towers and its series of domes, its balconies and galleries, would form a building that would be unsurpassed in the history of the world—a structure beside which the hanging gardens of Babylon would be obscured. It would take eighteen months to make the iron-work for the foundation.—*Iron Age.*

TRADE SURVEYS

The most gratifying feature of the business situation at this time is the remarkable expansion of manufacturing-capacity in all directions. From inquiries which have been specially made into various channels, it appears that there is greater activity, and more work in hand and in sight, than at any time for many years. Machinery manufacturers, engine-builders, boat and ship and car builders, bridge-builders, pipe line constructors, builders of factories, warehouses and dwelling-houses are all busy to an unusual degree. Very few stop to inquire how long this activity will continue. Those who have given the question any consideration think the activity is normal, and will continue indefinitely; and there is no one good reason for thinking otherwise. Panics and depressions have come and gone in decades past, and, of course, they may come again; but, at the same time, there is nothing in the present commercial horizon to warrant the prediction that the present trade conditions are leading to disaster. Money-lenders are full of hope, and borrowers find no difficulty in obtaining liberal consideration. The banks are anxious to assist all they can in the extension of business and the multiplication of enterprises. Values are at a safe level; speculative influences are doing but little to unsettle confidence. Only a legitimate advance is taking place in real-estate in city and country. Three years ago prosperity was jeopardized by a dangerous expansion of real-estate values in Western towns and cities; but the West suddenly realized that a dangerous course was being pursued, and a more conservative feeling has been developed. This conservatism, however, is largely due to the fact that railroad-building has been overdone. Writers upon railroad affairs never cease talking about the great mistake of building too many railroads in this country; but they fail to look closely into the question; compensating advantages have been developed, and their effects have been far-reaching. A vast amount of territory has been opened up by this "surplus" railroad-construction, and an outlet thus created for labor, capital and enterprise, which, but for this railroad-construction, would not have existed. New markets have been built up, and the product of thousands of mills and factories have been absorbed. It is unnecessary to follow this line of argument into its full details. The mistakes that American enterprise and rashness make always have their compensating advantages. The prosperous condition of the agricultural communities lies at the basis of the existing activity throughout the country. There are thousands of little manufacturers of machinery, tools, implements and appliances of various kinds in the West that owe their prosperity to the expansion of the agricultural area in the Gulf States and the trans-Mississippi region.

Iron and steel makers are receiving inquiries for supplies, and orders are being freely placed. A further advance in prices is likely to result before the end of the year. Steel rails have advanced $1 per ton within sixty days. Wrought-iron pipe was recently advanced; plate, tank and structural iron are also higher, and steel billets and slabs are at least $2 higher than they were three months ago. This advance, instead of checking enterprise, only stimulates those who have new work in hand to cover their requirements. Railroad earnings are showing up very well, although the managers are still in a fever of unrest and dissatisfaction over the complications which they cannot disentangle; but they see that the general conditions are improving, and admit that railway building is likely to take a fresh start next year. The anthracite coal companies have failed in their attempt to advance prices. The bituminous-coal producers are finding a heavier demand in the Atlantic States. There is a fair demand for block-coal, as well as other kinds, in the West. An immense amount of new coal territory is being opened in the South for manufacturing and coking purposes. Connellsville coke-ovens are all now under the control of two strong combinations, which will fight out the question of the management of the coke trade between themselves. Within a week, a cloud of statistics and facts have been published, and it is already evident that such material is having the intended effect of expanding autumn and winter requirements. All the great factors of trade are safe; all the lesser industries are crowded with work. Every day adds some strength to the markets. The rush of capital for employment is phenomenal, and in the extreme Southwest syndicates are operating in competition with railroad companies in the development of agricultural, mineral, timber, general real estate and railroad interests on an exceedingly large scale. Within a few days, two or three extensive irrigation schemes have taken shape, and more are to follow as soon as titles to land now almost valueless can be secured. There are some evidences of a returning land-speculating craze in some of the far Western States, and extensive transactions are being quietly arranged, in view of an extensive outflow to agricultural regions. There are also signs of reviving railroad building next season, in addition to those already noted, and investors are showing their faith in these signs by paying more attention to railroad securities. Railway managers are claiming that new Congressmen from Western States will go pledged to reasonable modifications of the railroad law. The railroad people propose to fight for such modifications as will, in their explanation of it, allow the natural laws of trade to act. Railroad bonds are finding better sale abroad, but foreign capital will not, perhaps, for years invest so rashly in American securities as in the past. A vast amount of reorganization is now in contemplation, and before two years have elapsed systems now acting alone will be controlled practically by the same head. It is this fact, so railroad managers assert, that will restore confidence, increase bond buying, and lead to increased railroad building soon.

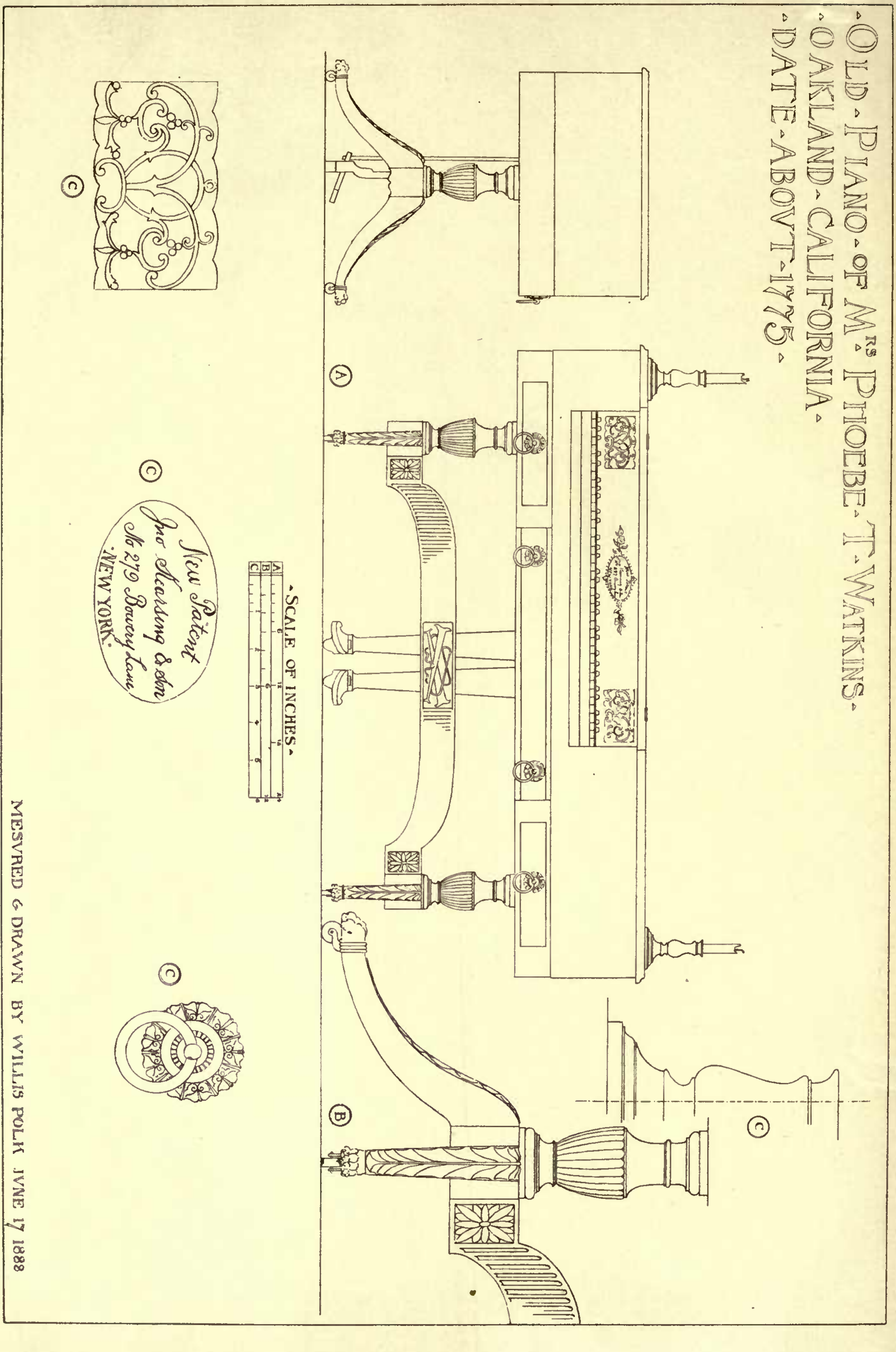
S. J. Parkhill & Co., Printers, Boston.

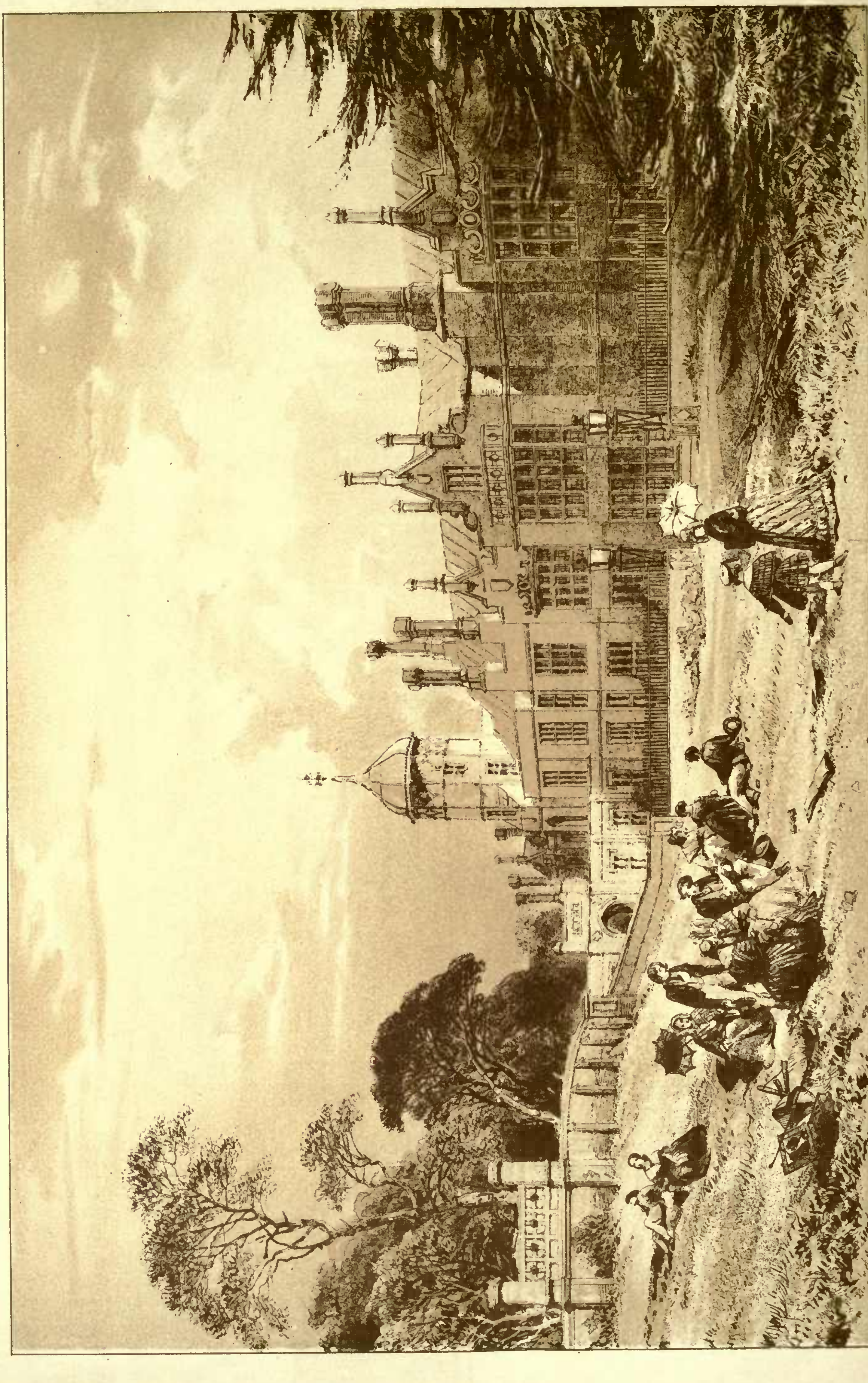


Residence of I. A. Baum, Esq.
Rochester, N.Y.

James G. Cutler, F.A.I.A. Architect.
Rochester, N.Y.

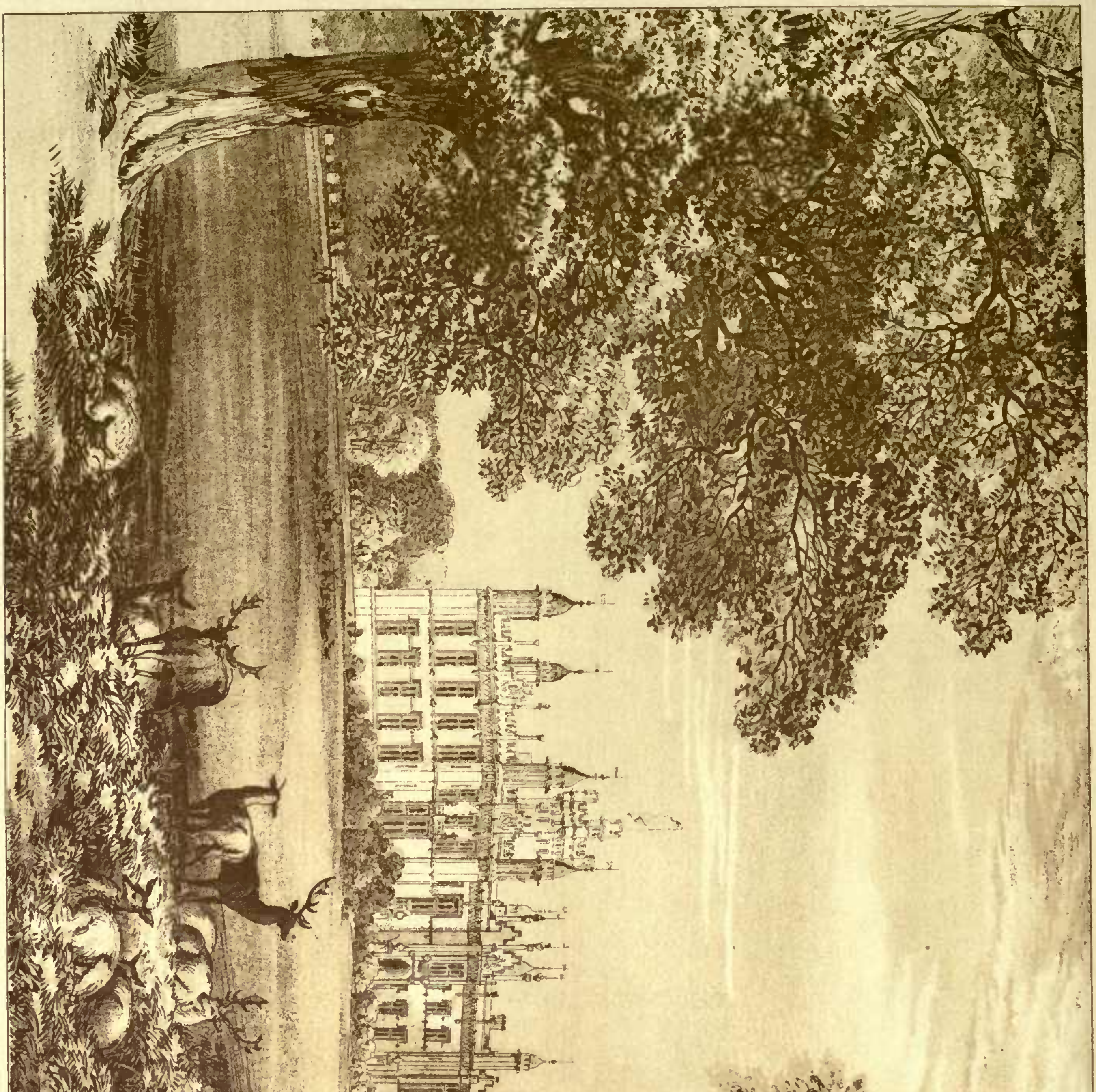
Heliotype Printing Co. Boston


OLD PIANO OF Mrs PHOEBE T. WATKINS
OAKLAND CALIFORNIA
DATE ABOVT 1775
A
B
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SCALE OF INCHES
New Patent
No 279 Bowery Lane
NEW YORK
MESVRED & DRAWN BY WILLIS POLK JVNE 17 1888



COBHAM HALL, KENT.

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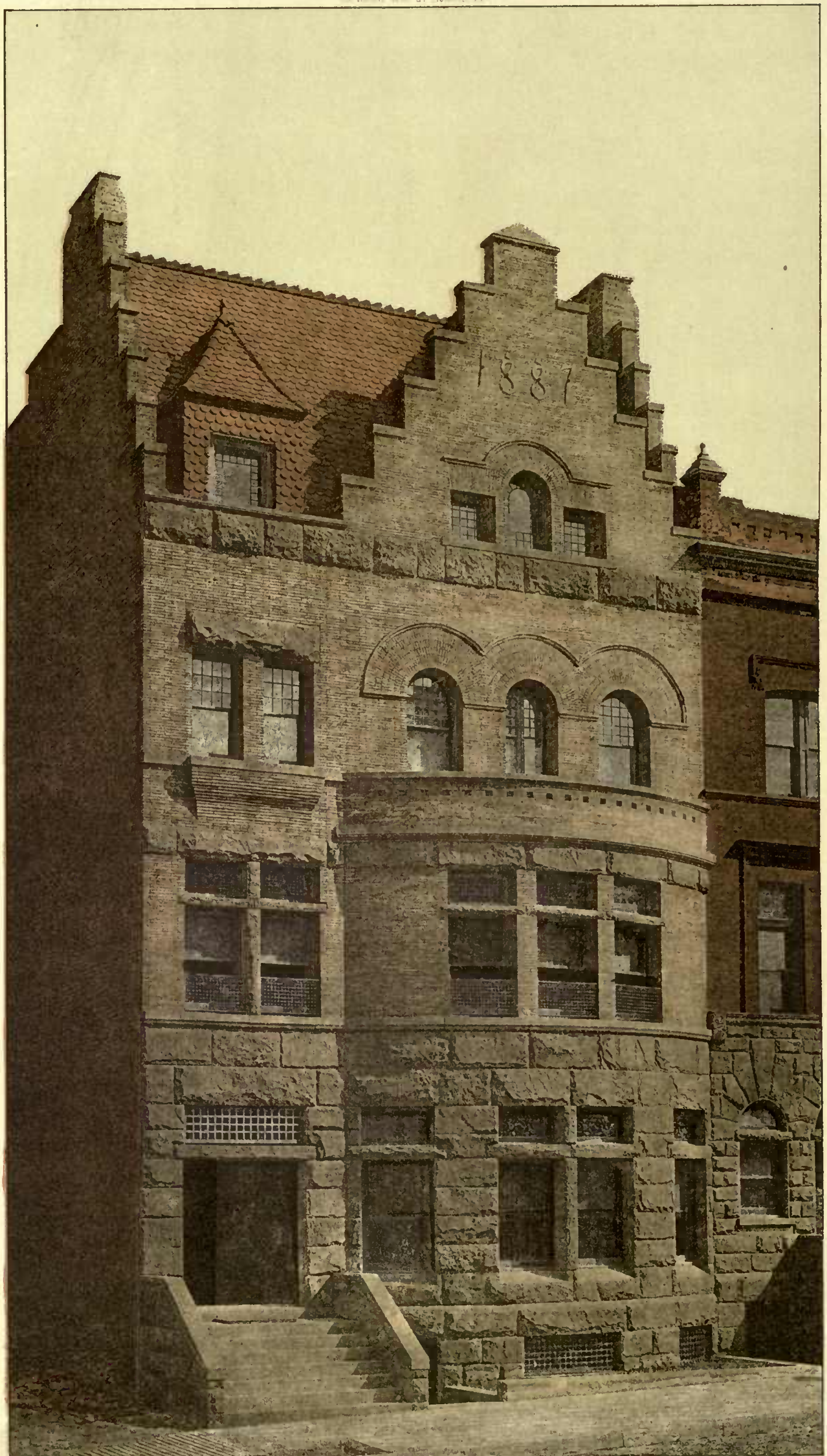
KNEBWORTH, HERTFORDSHIRE.

Heliotype Printing Co. Boston U.S.A.

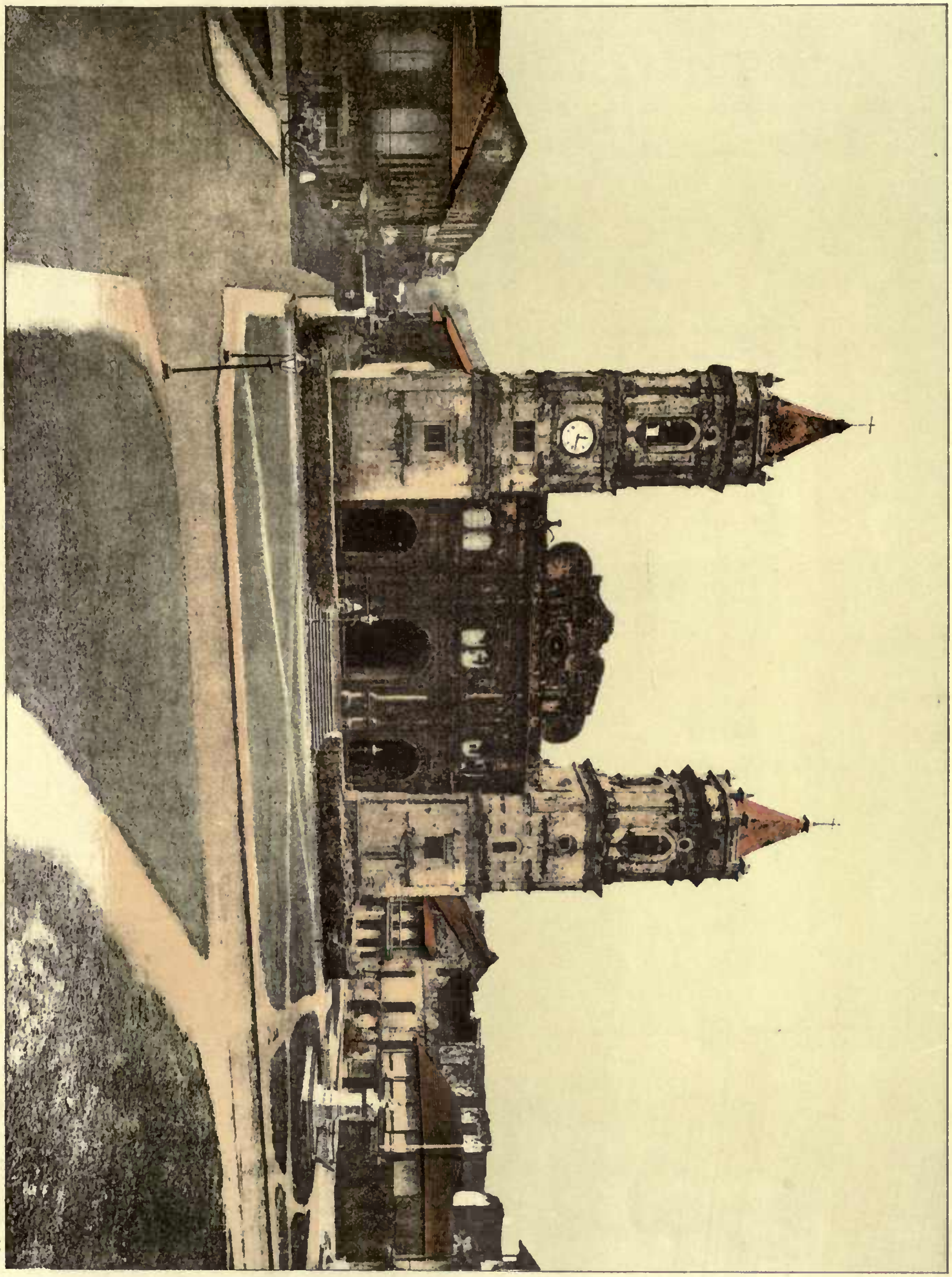


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HATFIELD HOUSE, HERTFORDSHIRE.

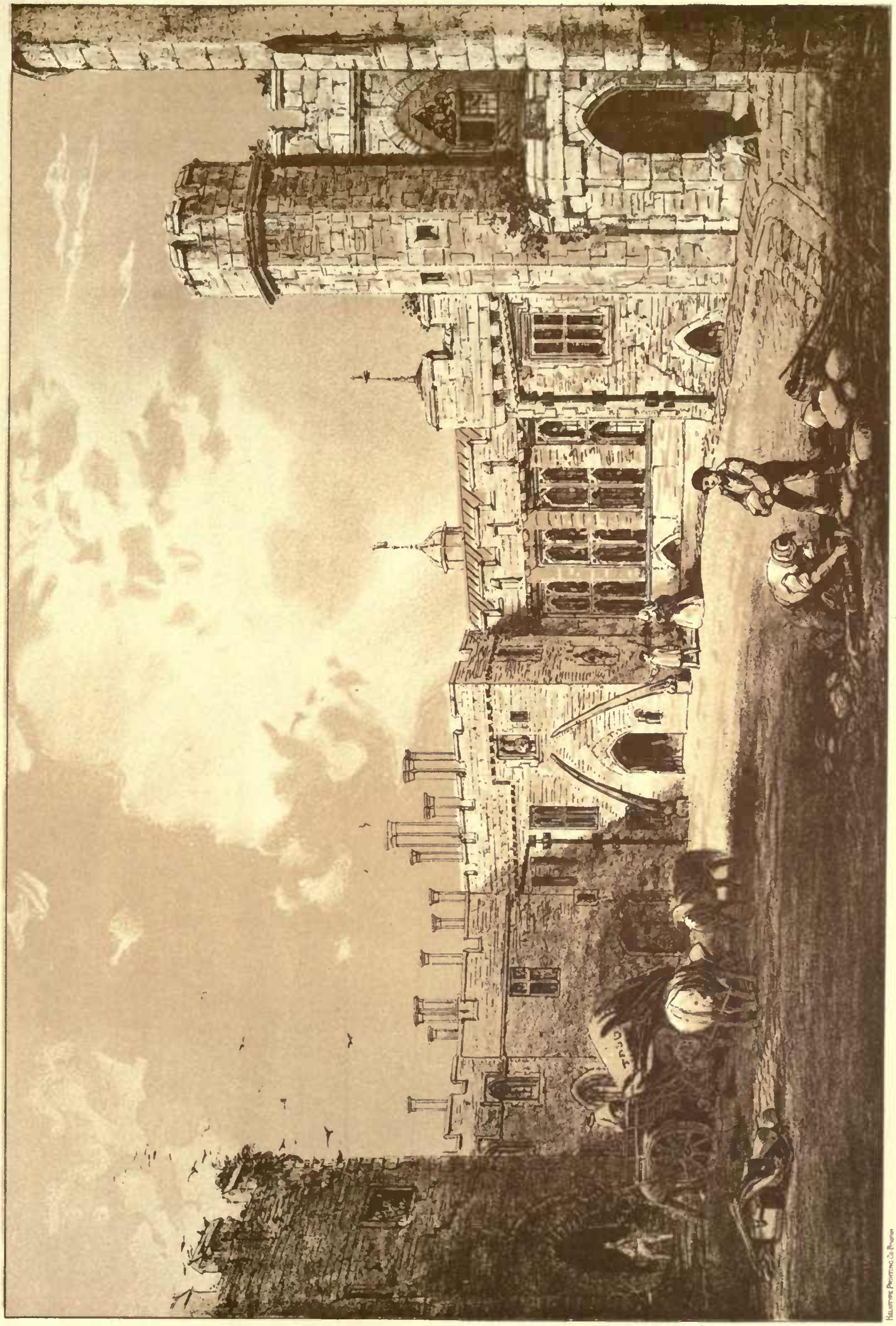


House of H. Murdock Esq. Montgomery St. . .
Brooklyn, N.Y. . . C. P. H. Gilbert Arch't.



THE CATHEDRAL, PANAMA, S.A.

AMERICAN ARCHITECT AND BUILDING NEWS, SEPT. 21, 1889. No. 717.



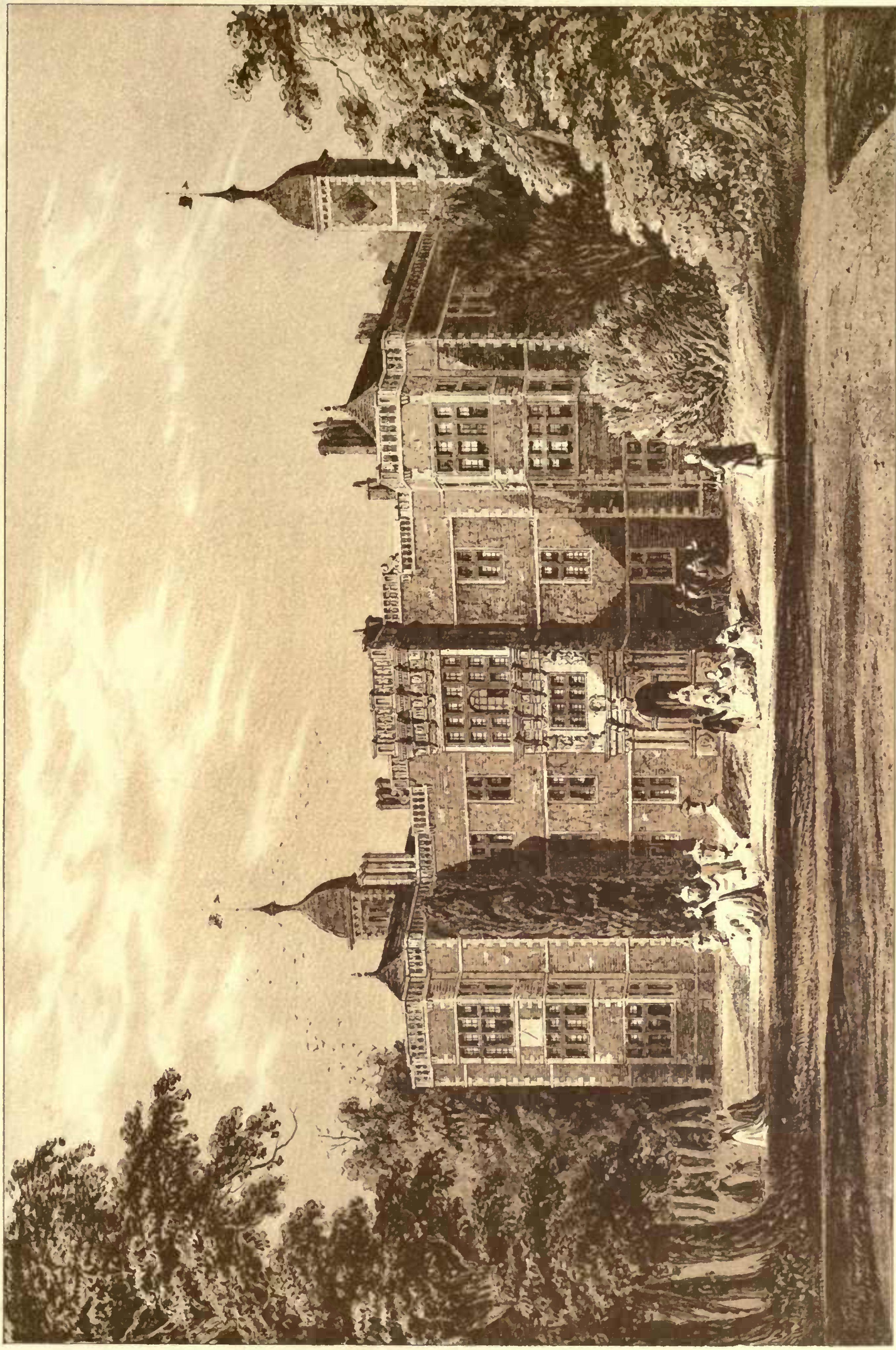
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BERKLEY CASTLE, GLOUCESTERSHIRE.

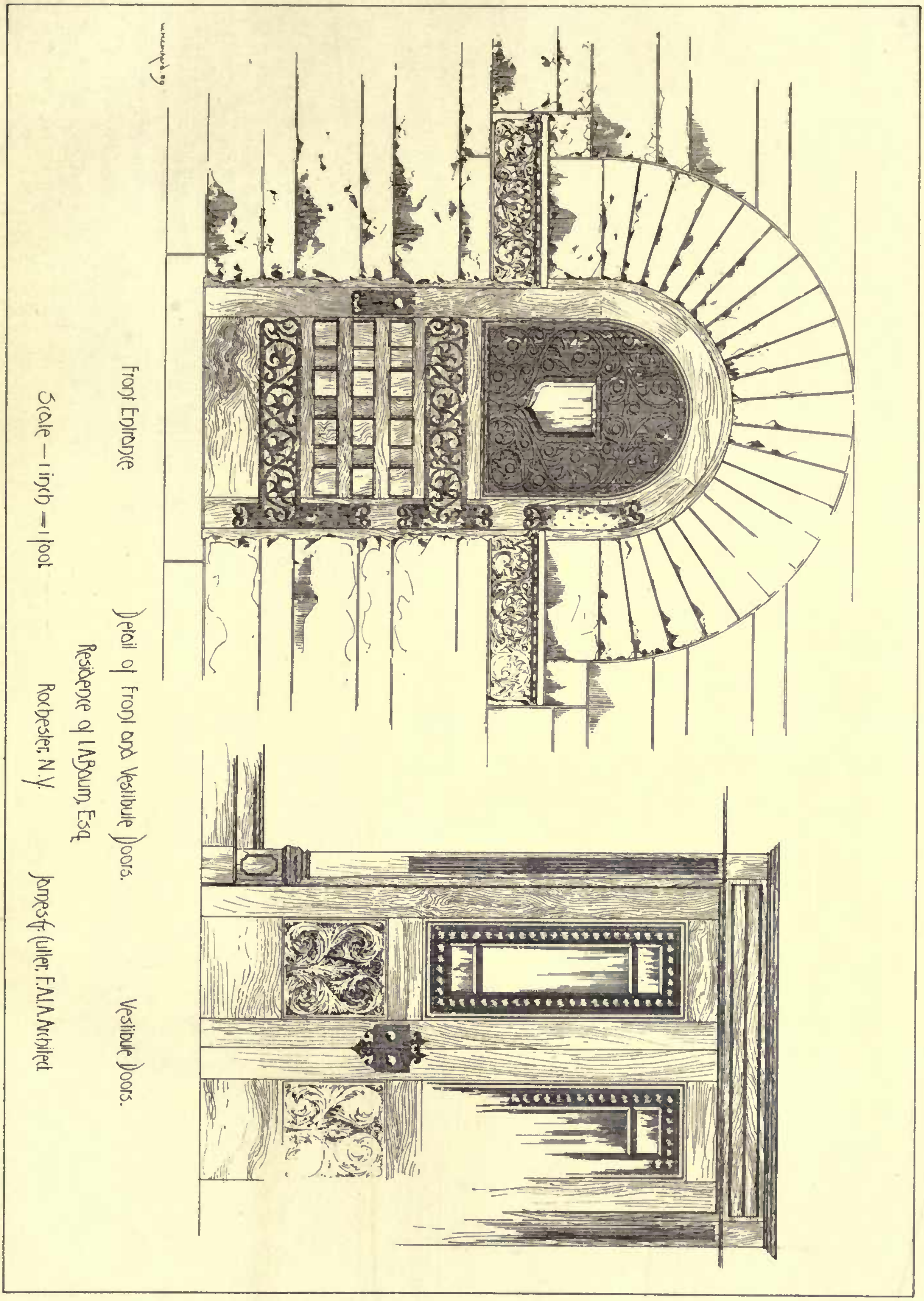


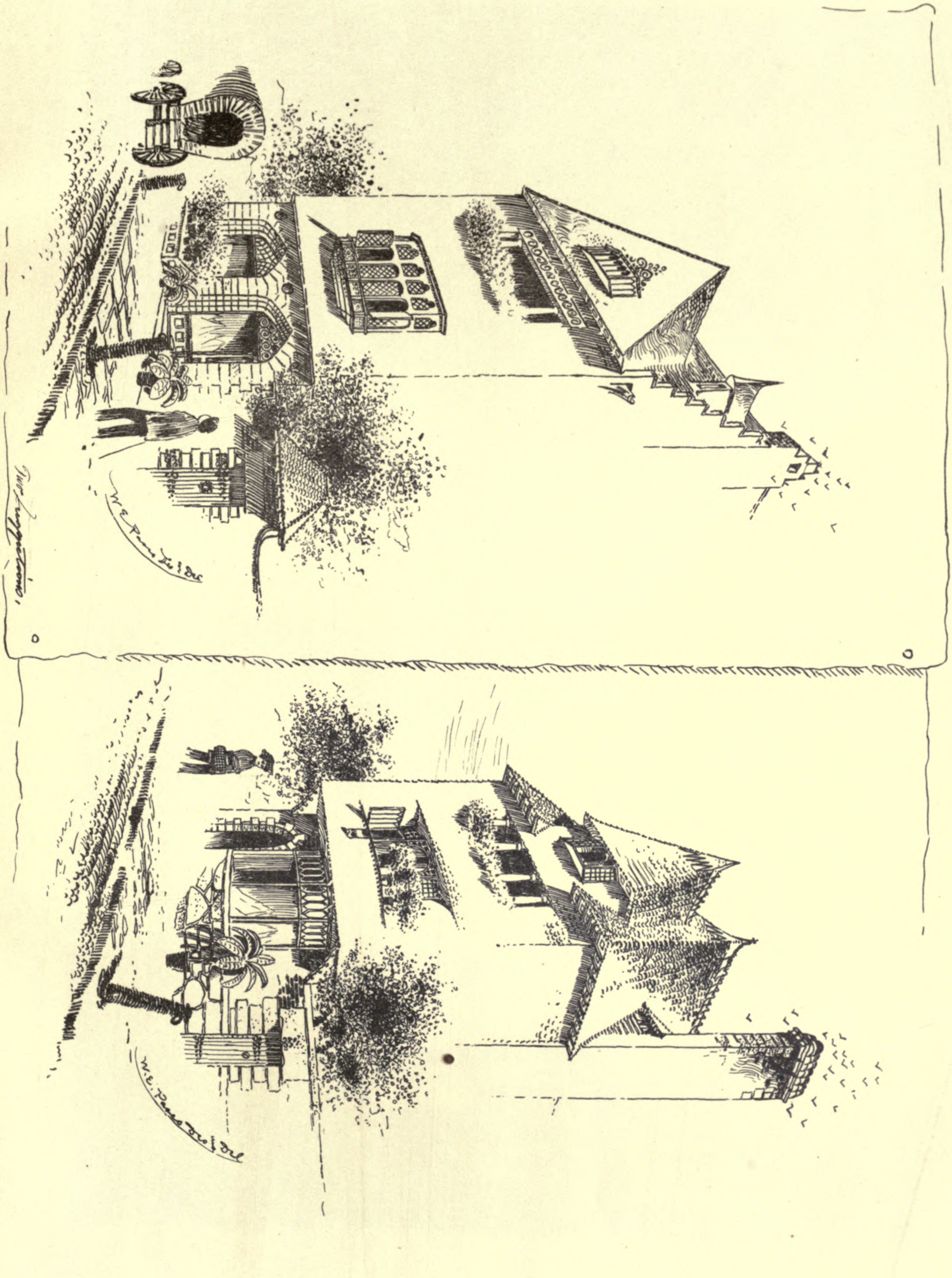
HEVER CASTLE, KENT.

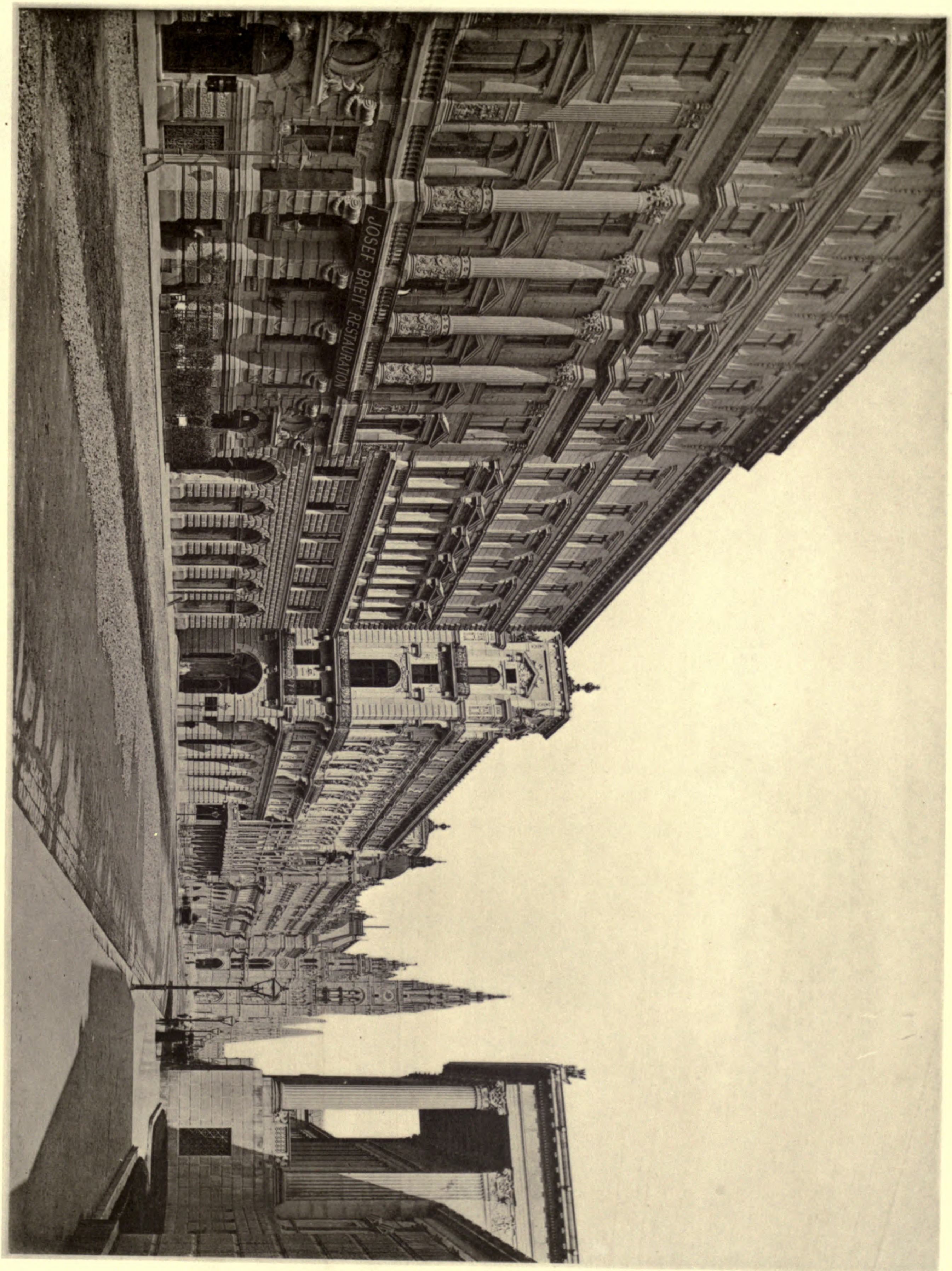
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CHARLTON HOUSE, KENT

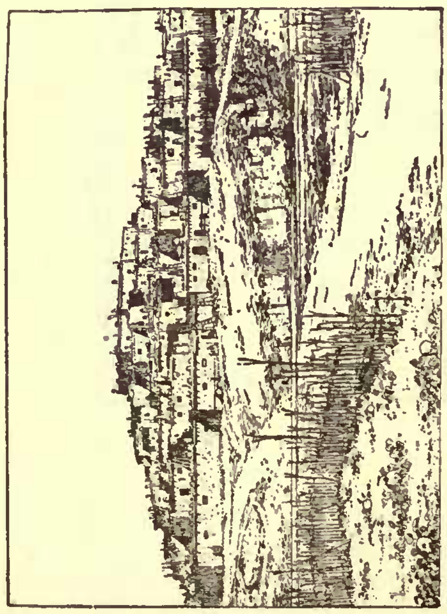

Front Entrance
Scale — 1 inch = 1 foot
Detail of Front and Vestibule Doors.
Residence of I. A. Baum, Esq.
Rochester, N.Y.
James G. Cutler, F.A.I.A. Architect
Vestibule Doors.


Two Suggestions.

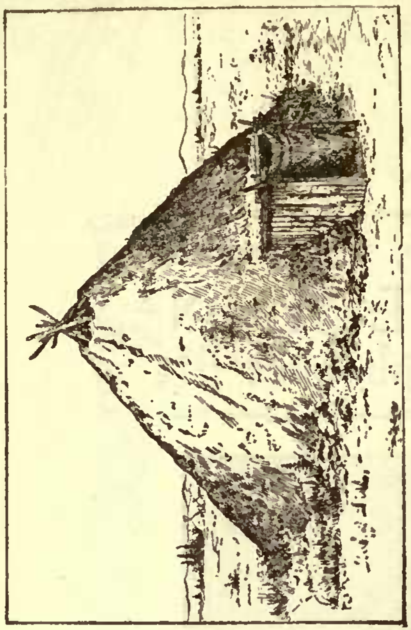


A STREET VIEW, VIENNA, AUSTRIA.

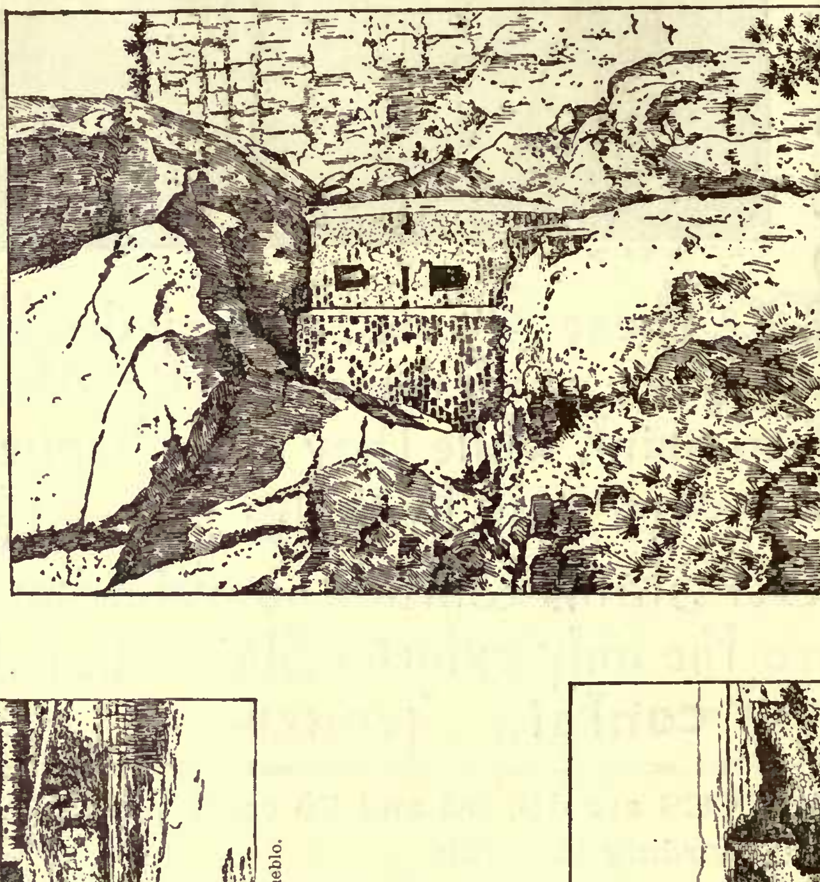
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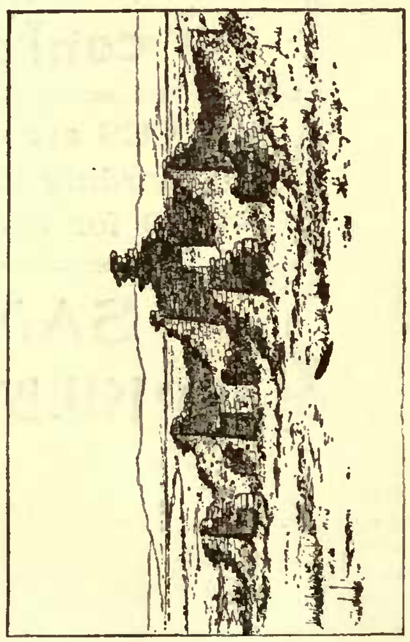
Typical Terraced Communal Pueblo.



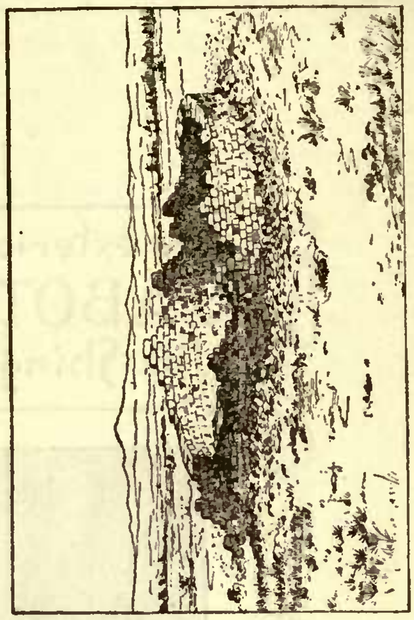
A Navajo Hut.



A Typical Cliff Dwelling.



Typical Solitary House.



Pueblo Lava House.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXVI. No. 718.

SEPTEMBER 28, 1889.

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EVER since the close of the competition for the Cathedral of St. John the Divine we have been more or less occupied in an endeavor to bring about the publication of the competitive designs in large folio form, and in a style of book-making commensurate with the dignity of the occasion. But we have found that there was so great a diversity of opinion amongst the competitors as to how and when their designs should be laid before the public that we have been forced to abandon the scheme of making an elaborate special publication. But what is a loss to the few who would have paid for the more expensive work will prove a gain to some of our subscribers, since we have decided to publish in several enlarged issues of the Imperial Edition a selection from the designs submitted, and, though less satisfying than if shown at a larger scale, we believe that very little will be sacrificed to the exigencies of the situation. The first of these special issues will be made on Saturday, October 5, and, as is always the case with special issues, the retail price will be increased. This intimation is thrown out merely for the benefit of the occasional public, since, of course, our subscribers reap the benefit, without extra charge, of any additional attraction that their own cordial support enables us to lay before them from time to time.

THE younger part of the profession in Boston has met with a severe loss in the death of Mr. Ernest G. Hartwell, who was accidentally drowned this week while endeavoring, with a companion, to sail out in stormy weather in a small boat to reach a yacht which was waiting for them. Mr. Hartwell was the only son of Mr. Henry W. Hartwell, one of the best-known architects in the country, and was a junior in his father's office. He had been very thoroughly trained for his profession, and gave promise of a brilliant future. After graduating with distinction from the four years' course in architecture at the Massachusetts Institute of Technology, with the degree of Bachelor of Science, he spent some time in the office of Messrs. Hook & Hastings, organ-builders, in Boston, where he was able to acquire a valuable knowledge of a special department of professional work, and at the same time increase his knowledge of music, of which he was passionately fond. He then began regular work in his father's office, where he continued, as an able and trusted assistant, until his death, allowing himself only one long vacation of something more than a year, which he spent abroad in sketching and studying with characteristic energy. Among the young architects and draughtsmen of the city Mr. Hartwell was a greatly respected and popular companion. He was an officer of the Boston Architectural Club and a leader in several musical associations.

THERE is a good deal of talk in France just now about forming a company to insure architects against loss through the responsibility which the law imposes upon them for the security of the buildings which they design, and it seems quite probable that the idea may be carried out. The French law is much more fair to architects than ours. The foundation of the jurisprudence on the subject is the article in the Code Napoléon, which says that "if a building perishes, either wholly or in part, from vices in construction, even from defects in the ground on which it stands, the builder and architect shall be jointly responsible for ten years," but at present, this article is always interpreted so as to apportion the fault between the architect and contractor in something like a fair ratio, the architect being regarded as responsible for a "grave fault" only if his plans are proved to have been so ignorantly or carelessly made that the defects were the natural consequence of carrying them out, and only for a "light fault" if they proceed from the improper workmanship or materials furnished by the contractor, even though the architect may have supervised the workmanship, and seen the materials used without objection; while the contractor's liability is, so to speak, the reciprocal of that of the architect. The idea which prevails here, that the architect guarantees the fidelity of all contractors, including any rascals that his client may see fit to employ, and that, if his client is cheated by them, he must make good the loss, while the cheaters keep the money, although now entirely obsolete in the French courts, still makes its appearance occasionally among pig-headed laymen, and seems to have once prevailed among judges. The most celebrated case under the old interpretation of the law, and, perhaps, the one which, by its obvious cruelty and injustice, led to the modern device of separating the architect's liability into two sorts — one for "fautes lourdes," due to his incompetence or carelessness in preparing the plans, and the other for "fautes legères," consisting in negligent supervision of the work or materials furnished by the contractor — is that of Gauthier, the architect of the hospital of Lariboisière. Gauthier, as the designer of this celebrated building, gained the highest reputation throughout Europe. He was elected one of the "forty immortals" of the Institute of France, and was made by the Government an officer of the Legion of Honor. Long after the completion of Lariboisière, the city of Troyes, Gauthier's native place, undertook to build a hospital, and nothing would satisfy the citizens but to have their illustrious compatriot make the plans. They were made and sent to Troyes, tenders invited, and the contract awarded to the lowest bidder. Gauthier made as many visits to the work as Parisian architects generally did to buildings out of town, but, not being endowed, any more than the rest of us, with the gift of seeing what defects existed in the middle of a mass of masonry which was all covered up before he arrived, the contractor succeeded in concealing a large amount of bad workmanship. After the building was done, the contractor's tricks began to show their natural effect in settlements, cracks and other disorders. The town claimed damages from the contractor, who immediately failed, and it then laid hold of Gauthier under the code, which, as interpreted at that time, made him jointly (*solidairement*) responsible with the contractor. The case was decided against the unfortunate architect, who was condemned to pay forty thousand dollars to make good another man's intentional frauds, which he could not have detected or prevented, even if he had given up his own proper business to try to do so. Gauthier could not pay the money, any more than the contractor could, but, instead of allowing him, like the contractor, to make an assignment of his ostensible property, and then go off to live comfortably on the judiciously concealed profits of his tricks, his fellow-townsmen pursued him until, having secured what property he possessed, they had him dragged to the debtor's prison at Clichy, where he remained until his death, in 1858.

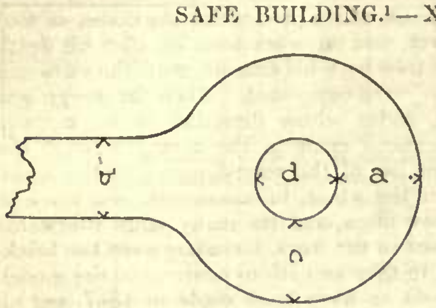
AT the International Congress of Hygiene, held in connection with the Exposition at Paris this year, MM. Emile Trélat and Somasco presented a paper on the warming and ventilation of dwelling-houses, which contains some new

suggestions. In their view, as in that of Mr. Leeds, the oldest of the American ventilating engineers, the perfection of comfort in artificial heating is to be secured by having the walls of the rooms warmed, while the air in them is kept comparatively cool and fresh; but they go much further than Mr. Leeds in the application of the principle. In houses managed as they would have them, all the artificial warmth enjoyed by the occupants should be radiated from the walls, and from the other objects in the room, which are themselves warmed by the radiation from the walls, and the air in the rooms should be taken directly from out-of-doors, even in the coldest weather, by openings as numerous and varied as possible, so as not to cause objectionable draughts. Naturally, the French idea of a draught is different from that which prevails in our climate, and MM. Trélat and Somasco think it would be an excellent arrangement to have all rooms provided with windows on two opposite sides, which should be kept open "whenever the weather would permit," while in "half-cold" weather a single pane, or portion of the windows only need be opened, and in the dead of winter it would be sufficient to introduce air through sheets of glass "perforated with numerous small conical holes," which would be in general "permanently open," but might be closed during tempests and snowstorms. Besides these windows, they think there should be openings "in various parts of the walls, as high up as possible." Notwithstanding all that has been said about this system of warming houses, we do not know that it has ever been tried, at least in this country, and, with our facility in the use of steam and hot-water pipes, it is rather curious that no one should have made the experiment. Mr. Leeds used to compare such heating with the exhilarating effect of an open wood-fire in a cool room, but it would be impracticable to warm the walls of a room so as to give out anything like the radiation of a fire, and we are inclined to think that for our winter days it would be necessary to close the ventilators long enough to allow the air in the rooms to become warmed by convection about to the point at present customary. As we have all experienced, a person exposed to severe cold out-of-doors is obliged to resist its effects by an effort, partly muscular and partly nervous. It is a common saying, that one can warm himself in a cold day by taking long breaths, and keeping his lungs inflated as long as possible, and a certain effort of the will assists in preventing the body from yielding to a chill, but either sort of exertion is fatiguing, and when it is over, it is necessary to relieve the body by remaining for a time in the atmosphere much warmer than would be comfortable at ordinary times. The Esquimaux pass their nights in an excessively warm, close atmosphere, inside their snow-huts, where the conditions are the reverse of those which the advocates of the new system consider desirable, but they can come out the next morning and hunt bears all day, with the thermometer at sixty below zero. MM. Trélat and Somasco have another idea, which is certainly an excellent one, about the importance of porous walls. According to statistics which they mention, it is found that in districts where houses are built of soft limestone, and other permeable materials, the walls inside are bright and fresh, and the air pure, while in the countries where granite, gneiss, slate or hard sandstone are the building materials, the walls, impervious to air, are damp and stained with condensation inside, and the rooms are foul-smelling and unwholesome. This agrees with the experience of the Massachusetts State Board of Health, which found that consumption was most prevalent among people who lived in stone houses; that brick houses harbored fewer cases in proportion, and wooden houses least of all; and with the facts reported by Pettenkofer, who found that in brick houses about one-half the air entering the rooms from all sources came through the walls; and an architect who can persuade a client to build a house with porous, aerated walls, or who will try the experiment himself, may be able to render an important service to the science of hygiene.

SIGNOR MELANI writes to *La Construction Moderne* some curious bits of history in regard to the dome of the Cathedral of Florence. Of course, Brunelleschi is agreed on all hands to have been the person principally concerned in the construction of the dome, but it has recently been claimed that the design belonged to a previous period, and that in its execution other persons were associated with Brunelleschi, with authority nearly or quite equal to his. The fact seems to be that Arnolfo da Cambio left a design for the dome, as well as the rest of the church, and the work went on after his death substantially in accordance with his scheme, until the nave and a portion of the apses were completed. Then the design was thoroughly examined, under whose direction is not certain, and important modifications made in the arrangement of the dome, and the construction of the semi-domes over the apses. An elaborate model of the whole, in masonwork, was made in accordance with the new ideas, and for many years afterwards every one who took part in the work, including even the bricklayers, was compelled to take an oath to conform to the model. This official model seems to have been made in 1367, and up to 1407, forty years later, when five of the apsidal chapels had been finished, the model appears to have been strictly followed. In 1421 the other three apsidal chapels were completed, but meanwhile there seems to have been a question about the resistance of the arches by which the chapels open into the space beneath the dome, and there is some reason to suppose that the octagonal drum, with its circular windows, was carried up at that time as a constructional expedient for loading the arches beneath, without authority from the model, and that Brunelleschi found it nearly completed when his connection with the work began. Beyond the drum of the dome the authorities of the church seem to have had no ideas whatever, a circumstance which goes to confirm the surmise that the model had been abandoned before the drum was built; and in 1418 they called upon all persons who had any projects or models in regard to the completion of the dome to present them before a certain date. Brunelleschi, who had been for some time thinking over the problem as an amateur, got Donatello, and a certain Nanni di Banco, to help him, and the three made a small dome of brick and mortar, without centering, which they presented for competition. Ghiberti, who, like Brunelleschi, was a goldsmith of unusual energy, also appeared as a competitor, with not one, but several model domes, one of which was put together with masonry, much in the same way as that of Brunelleschi and his friends. What might have been the other plans submitted we do not know, but it is certain that the church authorities were equally pleased with those of Ghiberti and Brunelleschi, and solved the competition, with the usual tact of lay judges, by appointing them joint architects of the dome. Donatello and Nanni thereupon disappeared from the scene, and both Brunelleschi and Ghiberti are shown by the records to have drawn salaries as architects of the dome until 1425, when Ghiberti, who had just been commissioned to execute the second door of the Baptistery, resigned his place at the cathedral, and Brunelleschi reigned as sole architect until his death in 1446. How much Ghiberti contributed toward the design of the dome it would be hard to say. The story is that Brunelleschi found him a mere incumbrance, and tried successfully to drive him off by pretending to be ill at a critical point in the construction, so as compel him to show his ignorance, which he did by building something which had to be torn down; but there is no hint in the records of any demolition or rebuilding of any part of the work, and Ghiberti had a good reason for resigning to devote himself to his second "Gate of Paradise," while the fact that he had been actively engaged at the cathedral for seven years indicates that his efforts were satisfactory while they lasted.

THE color of the Eiffel tower has been one of the puzzles of the Paris Exposition, no two persons agreeing as to what the real color is. Some people imagine that it has been plated with nickel or silver, while others call it red, and others again think that it is of a beautiful bronze color. The fact is that it is painted in five shades of the same color, modulated with the skill that the French often show in cases of the kind. From the base to the first platform, the color is a dark "Barbedienne" bronze, verging a little to red; thence to the second platform the color is the same, but lighter, and from this point to the top the color grows constantly lighter, by five successive gradations, the top being almost a golden yellow. Three coats of paint are spread over the entire surface, and over all is a coat of very hard, transparent varnish, which, by reflecting the sun, adds to the difficulty of defining the color with precision. The varnish is a new, patent compound, we believe, but it is said to have borne the severe test of use on the ironwork of the tower extremely well.

SAFE BUILDING.[1] — XXXIV.



WHEN a strain on a beam is never completely removed, but changes constantly from a larger to a smaller strain, both however in the same direction, the effect is not so great as where both strains are at times constantly removed.

In such cases the effect can be found from the following Formula:

Variable Strains.

$$w = (w_{,} - w_{,,}).\,x + w_{,,} \qquad (106)$$

Where w = the corresponding dead load, or constant strain in pounds, per square inch, to produce the same effect as one alternating between two unequal loads or strains $w_{,}$ and $w_{,,}$, but both in the same direction.

Where $w_{,}$ = the larger of the alternating loads or strains, in pounds, per square inch.

Where $w_{,,}$ = the smaller of the alternating loads or strains, in pounds, per square inch.

Where $x = 3{,}0$ for cast-iron, and $= 1\frac{1}{2}$ for wrought-iron and mild-steel.

The above condition would frequently happen in the case of warehouse floors, bridges, and other places where there is a constant dead load, which at times is increased by other loads to be carried.

If the additional load is put on suddenly, or is a moving load, it should be doubled. In that case $w_{,}$ would be equal to the doubled dynamic load plus the static load, and $w_{,,}$ would be equal to the static load.

In all designs of metal structures great care should be taken to design all parts, not only of practicable shapes and sizes, but of dimensions that will not involve increased cost.

Economical Designing. As a rule cast-iron, wrought-iron and steel are estimated at a certain price per pound. If the sizes are not unusually small nor unusually large the price will be the usual one. If, however, the sizes are very light the price will be greatly increased, for two reasons. The cost of preparatory work, working drawings, office expenses, models, etc., will be practically the same as for heavier work; the handling and labor will be very nearly the same, and in very light construction all this must be borne by fewer pounds and the price is consequently greater. On the other hand, if the pieces are unusually heavy, or large, or long, they may require special rolling or casting, and may require special

TABLE XXXIII.

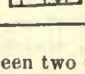
PROPORTIONS FOR

SCREW THREADS,				NUTS,						and BOLT HEADS.					
Diameter of Screw.	Threads per Inch.	Diameter at root of Thread.	Width of Flat.	Short Diameter Rough.	Short Diameter Finish.	Long Diameter Rough.	Long Diameter Rough.	Thickness Rough.	Thickness Finish.	Short Diameter Rough.	Short Diameter Finish.	Long Diameter Rough.	Long Diameter Rough.	Thickness Rough.	Thickness Finish.
1/4	20	,185	,0062	1/2	7/16	37/64	45/64	1/4	3/16	1/2	7/16	37/64	45/64	1/4	3/16
5/16	18	,240	,0074	19/32	17/32	11/16	27/32	5/16	1/4	19/32	17/32	11/16	27/32	19/64	1/4
3/8	16	,294	,0078	11/16	5/8	51/64	31/32	3/8	5/16	11/16	5/8	51/64	31/32	11/32	5/16
7/16	14	,344	,0089	25/32	23/32	29/32	1 7/64	7/16	3/8	25/32	23/32	29/32	1 7/64	25/64	3/8
1/2	13	,400	,0096	7/8	13/16	1	1 15/64	1/2	7/16	7/8	13/16	1	1 15/64	7/16	7/16
9/16	12	,454	,0104	31/32	29/32	1 1/8	1 3/8	9/16	1/2	31/32	29/32	1 1/8	1 3/8	31/64	1/2
5/8	11	,507	,0113	1 1/16	1	1 7/32	1 1/2	5/8	9/16	1 1/16	1	1 7/32	1 1/2	17/32	9/16
3/4	10	,620	,0125	1 1/4	1 3/16	1 7/16	1 49/64	3/4	11/16	1 1/4	1 3/16	1 7/16	1 49/64	5/8	11/16
7/8	9	,731	,0138	1 7/16	1 3/8	1 21/32	2 1/32	7/8	13/16	1 7/16	1 3/8	1 21/32	2 1/32	23/32	13/16
1	8	,837	,0156	1 5/8	1 9/16	1 7/8	2 19/64	1	15/16	1 5/8	1 9/16	1 7/8	2 19/64	13/16	15/16
1 1/8	7	,940	,0178	1 13/16	1 3/4	2 3/32	2 9/16	1 1/8	1 1/16	1 13/16	1 3/4	2 3/32	2 9/16	29/32	1 1/16
1 1/4	7	1,065	,0178	2	1 15/16	2 5/16	2 53/64	1 1/4	1 3/16	2	1 15/16	2 5/16	2 53/64	1	1 3/16
1 3/8	6	1,160	,0208	2 3/16	2 1/8	2 17/32	3 3/32	1 3/8	1 5/16	2 3/16	2 1/8	2 17/32	3 3/32	1 3/32	1 5/16
1 1/2	6	1,284	,0208	2 3/8	2 5/16	2 3/4	3 23/64	1 1/2	1 7/16	2 3/8	2 5/16	2 3/4	3 23/64	1 3/16	1 7/16
1 5/8	5 1/2	1,389	,0227	2 9/16	2 1/2	2 61/64	3 5/8	1 5/8	1 9/16	2 9/16	2 1/2	2 61/64	3 5/8	1 9/32	1 9/16
1 3/4	5	1,491	,0250	2 3/4	2 11/16	3 3/16	3 57/64	1 3/4	1 11/16	2 3/4	2 11/16	3 3/16	3 57/64	1 3/8	1 11/16
1 7/8	5	1,616	,0250	2 15/16	2 7/8	3 25/64	4 5/32	1 7/8	1 13/16	2 15/16	2 7/8	3 25/64	4 5/32	1 15/32	1 13/16
2	4 1/2	1,712	,0277	3 1/8	3 1/16	3 5/8	4 27/64	2	1 15/16	3 1/8	3 1/16	3 5/8	4 27/64	1 9/16	1 15/16
2 1/4	4 1/2	1,962	,0277	3 1/2	3 7/16	4 1/16	4 61/64	2 1/4	2 3/16	3 1/2	3 7/16	4 1/16	4 61/64	1 3/4	2 3/16
2 1/2	4	2,176	,0312	3 7/8	3 13/16	4 1/2	5 31/64	2 1/2	2 7/16	3 7/8	3 13/16	4 1/2	5 31/64	1 15/16	2 7/16
2 3/4	4	2,426	,0312	4 1/4	4 3/16	4 29/32	6	2 3/4	2 11/16	4 1/4	4 3/16	4 29/32	6	2 1/8	2 11/16
3	3 1/2	2,629	,0357	4 5/8	4 9/16	5 3/8	6 35/64	3	2 15/16	4 5/8	4 9/16	5 3/8	6 35/64	2 5/16	2 15/16
3 1/4	3 1/2	2,879	,0357	5	4 15/16	5 13/16	7 1/16	3 1/4	3 3/16	5	4 15/16	5 13/16	7 1/16	2 1/2	3 3/16
3 1/2	3 1/4	3,100	,0384	5 3/8	5 5/16	6 7/32	7 39/64	3 1/2	3 7/16	5 3/8	5 5/16	6 7/32	7 39/64	2 11/16	3 7/16
3 3/4	3	3,317	,0413	5 3/4	5 11/16	6 21/32	8 1/8	3 3/4	3 11/16	5 3/4	5 11/16	6 21/32	8 1/8	2 7/8	3 11/16
4	3	3,567	,0413	6 1/8	6 1/16	7 1/16	8 21/32	4	3 15/16	6 1/8	6 1/16	7 1/16	8 21/32	3 1/16	3 15/16
4 1/4	2 7/8	3,798	,0435	6 1/2	6 7/16	7 17/32	9 3/16	4 1/4	4 3/16	6 1/2	6 7/16	7 17/32	9 3/16	3 1/4	4 3/16
4 1/2	2 3/4	4,028	,0454	6 7/8	6 13/16	7 15/16	9 3/4	4 1/2	4 7/16	6 7/8	6 13/16	7 15/16	9 3/4	3 7/16	4 7/16
4 3/4	2 5/8	4,256	,0476	7 1/4	7 3/16	8 11/32	10 1/4	4 3/4	4 11/16	7 1/4	7 3/16	8 11/32	10 1/4	3 5/8	4 11/16
5	2 1/2	4,480	,0500	7 5/8	7 9/16	8 13/16	10 25/32	5	4 15/16	7 5/8	7 9/16	8 13/16	10 25/32	3 13/16	4 15/16
5 1/4	2 1/2	4,730	,0500	8	7 15/16	9 15/64	11 5/16	5 1/4	5 3/16	8	7 15/16	9 15/64	11 5/16	4	5 3/16
5 1/2	2 3/8	4,953	,0526	8 3/8	8 5/16	9 43/64	11 7/8	5 1/2	5 7/16	8 3/8	8 5/16	9 43/64	11 7/8	4 3/16	5 7/16
5 3/4	2 3/8	5,203	,0526	8 3/4	8 11/16	10 3/32	12 3/8	5 3/4	5 11/16	8 3/4	8 11/16	10 3/32	12 3/8	4 3/8	5 11/16
6	2 1/4	5,423	,0555	9 1/8	9 1/16	10 17/32	12 29/32	6	5 15/16	9 1/8	9 1/16	10 17/32	12 29/32	4 9/16	5 15/16


Rough Nut = one and one-half diameter of bolt + 1/8.

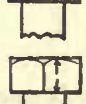

Finished Nut = one and one-half diameter of bolt + 1/16.

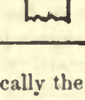

Rough Nut = diameter of bolt.


Finished Nut = diameter of bolt − 1/16.


Rough Head = one and one-half diameter of bolt + 1/8.


Finished Head = one and one-half diameter of bolt + 1/16.


Rough head = one-half distance between parallel sides of head.


Finished head = diameter of bolt − 1/16.

[1] Continued from page 110, No. 715.

cars and freight arrangement, special trucks, derricks, etc., or they may be very difficult to manufacture and involve much loss, many misgoes, etc.

The architect should, therefore, as far as possible design so as to use standard sizes.

In castings as well as in mill-work the standard will vary more or less with the parties doing the work. It will be impossible, therefore, to give here any universal standard. A few hints, however, may help the architect in economical designing.

Thickness of Columns. For hollow-castings (columns) Planat gives the following as the French standard, the thicknesses being the *minimum* or *smallest* thickness possible for the length.

For columns 6′ 6″ long not less than ⅜″ thick
For columns 9′ 10″ long not less than ½″ thick
For columns 13′ 1″ long not less than ⅝″ thick
For columns 19′ 8″ long not less than ¾″ thick
For columns 26′ 2″ long not less than 1″ thick

The practice of American iron-works is to regulate the thickness with the diameter rather than the length. Thus our iron-works make columns under 6″ diameter about ½″ thick, those over 6″ diameter from ⅝″ thick and upwards.

For castings made to carry weight the thickness should be more. In columns the maximum thickness should depend upon the possibility of making the core stiff enough to keep its place in the centre. Large diameter with thinner shell (within reasonable limits) will give the most strength for the amount of material used, thick castings being much weaker, as already shown.

In rolled-work, beams, channels, tees, etc., of unusual length should be avoided. **Avoid great length.** Most sections are rolled to 30 feet in length without extra charge; beyond this there is an additional charge per pound, for every extra five feet or fraction thereof in length, if the section is heavy, up to 40 or 50 feet which is the limit for beams and channels, or up to 90 feet for angles. Then, too, very long pieces (over 30 feet long) involve being carried on two cars, which means extra freight charges, and very heavy pieces might be refused by many railroads. Where great length is desired it will be better, as a rule, to make it up of two pieces, the extra material required for the "splicing" being, as a rule, much more economical than the cost of manufacturing and handling long and heavy pieces.

In pieced work where angles are attached to beams, etc., if it is punched and fitted together at the mill with bolts the whole will be charged at a standard rate per pound; if, however, the pieces are riveted together, there will be an extra charge on the whole, even if only one rivet were used.

If pieces are required to be cut to exact lengths there is usually an extra charge on the whole. If pieces are required to be drilled or punched, there is an extra charge on the whole, even if there is only one hole in each piece.

TABLE XXXIV.

Recent Tests of Irons and Steels.

Material.	Remarks.	Per Cent. of Carbon.	Per Cent. of Silicon.	Per Cent. of Manganese.	Modulus of Elasticity, in pounds—inch, for Tension.	Modulus of Elasticity, for Compression.	Modulus of Elasticity, for Cross-Breaking.	Tension, in pounds, per square inch. Elastic Limit.	Tension, Ultimate Stress, t.	Compression, in pounds, per square inch. Elastic Limit.	Compression, Ultimate Stress, c.	Ultimate Modulus of Rupture, per square inch, k.	Ultimate Shearing Stress, per square inch. g=across grain. g_1=along grain.	Per Cent. of Elongation.	Per Cent. of Contraction of Area.	Number of tests averaged.	Authority.
Wrought Iron.	Different English Irons.				28560000	28985000		28500	56000	27600				7,01 to 17,87	5,9 to 51,4	12	English Steel Committee
	" German "	TESTED IN SIX DIFFERENT DIRECTIONS ACROSS AND ALONG THE GRAIN.											g=34 to 45000 g_1=15 to 22000			..	Bauschinger
	American Tie Rod 3¾″d..							22865	38085					2,4	2,2	2	Watertown Arsenal
	" " ⅞″d...							32716	54416					21,0	42,4	3	
Wrought Steel.	10″ Channel........							44650	73675	36235	41390			23,6	43,3	2	
	½″ Rolled Plate........	0,14			32000000	38250000		42000	63000	39500			g=48600	21,8	49,2		Bauschinger
	" "	0.51			31450000	32500000		48400	80000	46000			g=57000	14,3	25,1	12	
	" "	0,78			33556000	32450000		53200	92000	53000			g=59000	11,4	19,1		
	" "	0,96			30900000	32700000		69000	118000	71000			g=83000	6,6	10,0		
Cast, Crucible and Bessemer English Steels	Mean of 27 samples.....				29300000	30000000		47600	88800	47000				0,89	1,30		English Steel Committee
	Lowest (Bessemer).....				28400000	29100000		35840	74000	33600				to	to	27	
	Highest (Cast)........				29900000	31500000		60480	122600	60480				13,61	48,7		
American Steel.	Tubes for Rifled Cannon							32 to 52000	58 to 91000	46 to 54000	83 to 104000			4,7 to 30	11,8 to 59,3	206	Watertown Arsenal
	8″ Rifled Cannon......							30 to 67000	74 to 115000					5,8 to 31	0 to 57	52	
Steel Wire.	Am. tinned wr. for Can'n								160 to 181000						8,4 to 21,8	13	
	Foreign wire " "								264 to 329680						12,2 to 23,5	9	
Cast Steels.	Cast Steel, Open-Hearth	0,55	0,13	0,96	& 0,029%	of phosphorus	32000000	35 to 48000	60 to 97440	39 to 45000	65 to 74800	134340		2,0 to 18,0	1,5 to 30,6	23	
	Averaged from 14 tests	0,33	0,23	0,62					74000					23	41	5	Foster
		0,50	0,40	0,66					96000					9	12	3	
		0,77	0,46	0,67					85000					1,5	2	3	
		0,96	0,62	0,64					78000					1,33	1,6	3	
	American Steel........				29120000		24400000	29120	47264	28672		24125		0,4 to 29,9		11	Abbott
Steel.	Bessemer Plates........	TESTED IN SIX DIFFERENT DIRECTIONS ACROSS AND ALONG THE GRAIN.											g=53 to 66000 g_1=47 to 56000			..	Bauschinger
Malleable Cast Iron.	Square ⅝″........	American						1635	36176					3,8	5,8	2	Ricketts
	Rectangular 1″×⅜″........	"						2979	34272					2,4	6,6	1	
	Circular ½″ diameter...	"						2285	38976					3,5	10,0	1	
	" ¾″ "	"						1456	31032					1,3	3,9	2	
	German........							9856	36736					2,5	8,2	..	Martens
Cast Iron.	American, average........								17 to 30740		48 to 54800					44	Watertown Arsenal
	" ⅛″ to 1″ thick..	All undressed (with skin on,)					16453000					44680				7	
	" 1″ thick.......	the dressed ones (planed,) were					15483000					40640				1	
	" 1″ to 2″ thick..	found to be slightly stronger					15296000					37932				5	
	" 2″ thick.......	and results more regular.					13767000					36600				2	

For these reasons it is usual where there is much fitting, drilling, etc., to be done to have it done at the mill for the standard rate per pound. Where, however, there is only a little to be done, as is usually the case in building construction, it is cheaper to do it at the building, using portable hydraulic punches or other similar contrivances to facilitate the labor.

Cost of Fitting.

A saving can also be made by doing all painting of heavy work at the building, as the mills charge a standard price per pound of metal for each coat; but where this is done, the architect cannot be too careful in having all rust removed.

Practicable Plate-sizes.

In building up plate-girders, plates as wide as eight feet can be rolled, and of thickness and length in one piece not to exceed in finished weight two tons or four thousand pounds, this weight being about the limit for single pieces of rolled-work within reasonably economical limits.

Thus, for instance, we could get plates five feet wide, one inch thick and twenty feet long, or eight feet wide, one-half inch thick and twenty-five feet long. If we require wider plates (usually for deep webs) we must take an eight-foot wide plate and shear it off, splicing the pieces. Thus if we required a ten-foot deep web, we would shear the eight-foot plate in ten-foot lengths, would place them side by side vertically, connecting them by covering plates of some kind, and our web would thus be composed of a series of panels each ten feet high and eight feet wide. Plates should not be over one inch thick on account of the difficulty of punching, nor less than one-quarter inch thick for fear of loss by rusting and failure by buckling. In steel plates, Carnegie, Phipps & Co., of Pittsburgh will roll plates up to 9′.6″ wide and 14′.2″ long, if about $\frac{1}{2}$″ thick, or 9′.2″ long by above width, if $1\frac{1}{4}$″ thick. See Table p. 51 in their hand-book of 1889.

In round, square and flat bars almost any sizes can be made, but, here too, unusually light or heavy ones are charged at extra rates.

Sizes of Rounds, Squares and Flats.

The sizes of these vary with different mills, but are about as follows: The ordinary sizes for rounds and squares, are $\frac{3}{4}$″ to 2″ diameter, and for flats from 1″ to 4″ x $\frac{3}{8}$″ to $1\frac{1}{2}$″ and $4\frac{1}{8}$″ to 6″ x $\frac{3}{8}$″ to 1,″ these are made at regular rates.

But the mills will make, at additional rates, rounds from wire sizes up to $\frac{3}{4}$″ diameter and from 2″ to 7″ diameter; half rounds from $\frac{3}{8}$″ to $1\frac{1}{4}$″ diameter; squares from $\frac{5}{16}$″ up to 5″; flats from $\frac{11}{32}$″ x $\frac{3}{32}$″ up to 12″ x 2″.

In designing flats the best rule to follow is to make the thickness between one-fourth and one-third of the width, except for very wide bars, when it can be between one-eighth and one-quarter.

Where long bars are in tension, and one or both ends are held by nuts and screws, it is often economical to "up-set" the screw-ends, that is, enough material is added where the screw is cut, that is the diameter is enlarged enough at ends, to make the diameter at the root or thinnest part of the screw (that is between the threads), equal to the diameter of the whole bar. The screw itself is thus "upset," that is set upon the bar. The cost of upsetting screw-ends is more of course, than cutting screws upon ordinary bars, on account of the extra welding necessary, but in long bars, or very heavy bars, the material saved by not having to increase the diameter of the bar its whole length (to allow for cutting away at the ends), more than offsets the extra cost of up-setting. In light bars and short bars, as a rule, it is more economical to add enough to the diameter for the whole length to allow for cutting the thread at the end. In such a case the strength of the bar, in tension is, of course, only equal to the section at the root of the thread. It is a curious fact that threads cut with old dies are stronger than those cut with new dies; the old ones apparently crushing and thus leaving more material in the threads, while the new ones cut the material right out.

Up-set Screw-ends.

Different mills have different standards for threads, nuts, heads, etc. Practically, however, they all closely resemble the standards adopted by the Franklin Institute (of Philadelphia), February 17, 1866, and which are here reproduced by their permission as Table XXXIII.

Threads, nuts, etc.

In forming eye-bars the practice of different mills again varies.

It should be remembered that they are all welded, and therefore, if of wrought-iron, only some 80 per cent in strength of the metal in the bar. All parts should therefore be designed for some 25 per cent more strength than required with the usual factors-of-safety.

Eye-bars and pins.

For ordinary sizes of flat iron the mills have dies on which these eyes are "die-forged," that is, formed by machinery. The Phœnix Co., for instance, have some fifty-six sizes of dies for flats varying from 2″ x $\frac{5}{8}$″ up to 6″ x $2\frac{1}{2}$″. The New Jersey Steel and Iron Works have some forty seven sizes of dies for flats from $2\frac{1}{2}$″ up to 6″. Their standards for pins are $\frac{1}{16}$″ less than even quarter-inches, as $2\frac{5}{16}$″ diameter, $2\frac{7}{16}$″, $2\frac{11}{16}$″, $2\frac{15}{16}$″, etc. All pin-holes in eye-bars should invariably be drilled, and should always be made (not over) $\frac{1}{32}$ inch larger in diameter than the pin, to allow for slipping same in.

The practice of the latter company where eye-bars are of same thickness as the flat-bar, is to make the diameter of pin (if not governed by other circumstances) four-fifths of the width of bar (or $d = \frac{4}{5}.b$). In such a case the width of metal beyond the eye (at end of bar) is made equal to the width of bar (or $a = b$) and the width each side of eye equal to three-quarters of the width of bar (or $c = \frac{3}{4}.b$), see Figure 162. Where larger pins are used the proportion must be even more increased on account of the greater amount of weakening by welding.

The above sizes are good averages. In some cases the metal around the eye forms a concentric circle with the eye. In such cases (if not required to be larger) the radius of the eye is from three-eighths to one-half of the width of flat, and the radius of the surrounding circle is from four-fifths to nine-tenths (of the width of flat) *larger* than the radius of eye. The thickness of eye is, usually, but not necessarily, the same as that of the flat.

For further information as to sizes, etc., the reader should consult the hand-books issued by the different rolling-mills, taking care to get the latest issues, as they are constantly changing their rolls and stock sizes.

These books will also give the practice of each mill for locating holes in flanges of beams, channels, etc., sizes and weights of separators, manner of connecting beams by framing, etc.

Table XXXIV gives in condensed form the results of the most recently published tests on irons and steels.

POSTSCRIPT TO CHAPTER VIII.

Since writing the foregoing chapter a claim has been made by J. W. Bookwalter, an iron manufacturer of Springfield, Ohio, to have perfected a new process which will revolutionize the manufacture of iron and steel. He uses what he calls a Robert converter, which is the same in principle as the Bessemer, excepting that the air is blown in horizontally.

The claims made are: That he can produce any quality of iron or steel from the same furnace; that the impurities can be gathered and floated off on the surface; that the silicon can be controlled and burned out separately, ahead of, and without affecting the carbon, which can afterwards be reduced to any desired quantity, thus leaving the mass to be poured from the converter either pure wrought-iron, or steel of any grade, as may be desired; and that the control of the silicon and carbon is perfect.

Similar claims have been made before, but were never substantiated. Should, however, these claims prove to be genuine, it would at once mean a large saving in the cost of manufacture of all grades of iron and steel. It will be readily seen that not only is the cost of handling the iron several times and the cost of puddling (by hand) done away with (for if this invention does all that is claimed for it, the pig-iron could be melted and run directly to the final rolls), but the cost of furnaces, etc., will be greatly reduced, as one and the same converter will make any quality of iron or steel desired.

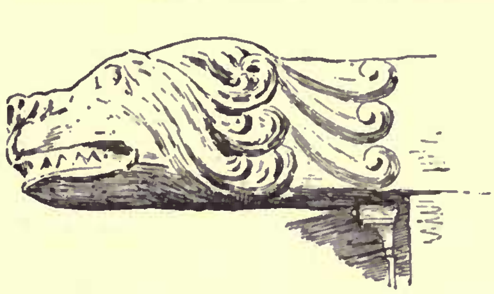
Then, too, it would solve the problem of strong, cheap castings, as these could now be made of a high grade of steel at about the cost at present of ordinary cast-iron; this, of course, would mean a casting with the forging, welding and other properties of wrought-iron.

It is also claimed that the blast need not be nearly so strong as in the Bessemer converter, and hence the cost of this new converter is not only very much less, but its tuyères and lining will outlive many times those of a Bessemer converter.

It is further claimed that not only is the reduction in cost of steel very great, but that the cost of rolled-iron is reduced to the same level as the cost of steel. LOUIS DECOPPET BERG.

[To be continued.]

THE POOLING OF BIDDERS.



PURCHASERS of bridges have only themselves to thank for the institution of pooling. Were contractors assured of fair dealing in every case, they would prefer to send their bids by mail; but, unfortunately, partiality is too often the order of the day. Therefore, in self-defence, they have been forced to pool. The following amusing incident was related at the rooms of the Engineers' Club of Kansas City, after one of the meetings, at which the contents of the first edition of this pamphlet were discussed. It was published the next morning in the Kansas City *Journal*, and, as it exemplifies very clearly one of the numerous tricks of the trade, it is reproduced here, notwithstanding its rather inelegant diction:

"A bridge-builder was telling me a sort of funny story the other day, and, I have no doubt, similar occurrences often happen. He was down in Southern Missouri some time ago to bid on a bridge. Of course he was pooling, or he wouldn't have been there. There were fourteen bidders in the whole crowd, and thirteen of them were to put in bids away up out of sight, while the fourteenth would put in a bid that would be just low enough to be in sight, get the work, and pay the other thirteen a commission.

"Some one ascertained that the Union Bridge Company, of Buffalo, had submitted plans to the commissioners, but had no representative

on the ground, and, of course, the pool was 'busted' unless the Union Company could be floored.

"Now, county commissioners don't know a bridge-plan from a picture of Christ before Pilate. They look at them very soberly, and, if no one is around who has sense enough to see that they are holding them upside down, they are quite liable to get a reputation for wisdom.

"We had to 'down' the Union Company or lose our travelling expenses, and one of the bidders present said:

"'I'll go in and look at those Union plans, and see if I can find anything the matter with them.'

"He went in and expatiated on his own plans, told the county commissioners that all the rest of us were thieves, and then came out and said:

"'Boys, those plans are on the table in there, and I can't find a cussed thing the matter with them except that the lower chord of the bridge is made of round iron instead of flat.'

"Well, of course you know that makes hardly any difference at all about the strength or durability of a bridge. It's just a little unusual, that's all, and I suppose that the Union Company would have given flat iron at the same price.

"Then I went in, and after telling the commissioners how good I was, and how my plans were the greatest effort of my life, I looked around casually and glanced at the Union plans and said: 'Humph! That fellow's pretty old-fashioned. Uses round iron, don't he?'

"Then I went out and the next man went in, and after ten minutes' free exhibition of the noblest public spirit Missouri ever produced, his eye caught the Union bridge-plans, and he said: 'Well, that fellow is cutting in on his margin of safety, I — should — say. Uses round iron in his bridge, don't he?'

"Then the next man stepped up, and after the usual ten-minute course in civil engineering, furnished free to the commission on account of official position, he said, the instant that his roving sight happened to be riveted by the glaring defect in the Union plans:

"'Holy smoke!'

"'What's the matter?' asked the bridge commissioners.

"'Nothing at all, gentlemen; nothing at all.'

"'Anything wrong with those plans there?'

"'Gentlemen, if there was anything wrong you would have to find it out from somebody else besides me,' and he went out.

"After the commissioners had been subjected to ten more such experiences they threw out the Union plans, and there were thirteen commissions paid for one contract." — *Iron Age.*

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

AN OLD GERMAN STREET.

[Gelatine Print, issued only with the Imperial Edition.]

SHADES AND SHADOWS, PLATE III.

SEE article on this subject, elsewhere in this issue.

A STAIRCASE IN THE CATHEDRAL, BURGOS, SPAIN, (XV AND XVI CENTURY WORK).

RETABLE IN THE CATHEDRAL, BURGOS, SPAIN, (XV CENTURY WORK).

PLATERESQUE DOORWAY, BURGOS CATHEDRAL, (XV CENTURY WORK).

XVI CENTURY CARVING, BURGOS CATHEDRAL.

SEE article elsewhere in this issue.

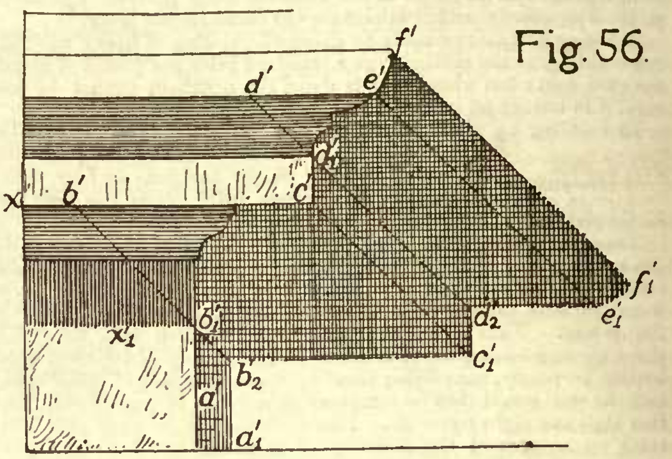
HOUSE OF H. F. WATSON, ESQ., ERIE, PA. MESSRS. GREEN & WICKS, ARCHITECTS.

A BLOCK OF HOUSES, NEW YORK, N. Y. MESSRS. CHARLES W. ROMEYN & CO., ARCHITECTS, NEW YORK, N. Y.

COOKING FOOD BY ELECTRICITY. — The Hotel Bernina, at Samaden, has for some time been lighted with electricity, power being supplied by a waterfall. As, during the day, this power is not required for lighting, and is, therefore, running to waste, the proprietor of the hotel has hit upon the idea of utilizing the current for cooking when it is not required for lighting, and an experimental cooking apparatus has been constructed. This contains German silver resistance-coils, which are brought to a red heat by the current, and it has been found possible to perform all the ordinary cooking operations in a range fitted with a series of such coils. — *The Electrician.*

ARCHITECTURAL SHADES AND SHADOWS.[1] — VI.

CHAPTER VI. — PRACTICAL APPLICATIONS OF FOREGOING PRINCIPLES.



Summary of principles already laid down; application in practice of rules given in Chapters IV and V; points of interest in delineation of architectural shadows in general; analysis of processes and operations employed in casting shadows of a porch in plan and in elevation.

63. BEFORE proceeding to the practical application of the rules and principles laid down in preceding chapters, it may be well briefly to summarize them as follows:

a. By finding the shadows of any two points we can locate the shadow of the right line passing through them, in direction, and in length also when the points given are the extreme points of the line.

b. The shadows of a number of points in a curve determine the shadow of the curve with an approximation to accuracy depending upon the number of the points; and the shadows of tangents give also the direction of the curve of shadow at each point of tangency. This principle is applied to the case of the circle by means of the circumscribed octagon.

c. The shadows of rectilinear solids — prisms, parallelopipeds and pyramids — can be found without knowing their lines of shade, by what we have called the "reverse process." The shadows of the faces, edges, or angles of the solid being found, the extreme outline thus obtained is the line of shadow, or shadow of the line of shade, which we can then identify by tracing back the rays from the various parts of the outline of shadow to points upon the projections of the solid.

d. Shadows of pyramids and cones are determined by the shadows of their vertices and bases; and the shadows of cylinders by the shadows of both bases connected by parallel tangents.

e. It has also been observed that any coördinate plane of incidence may be taken as a plane of projection, so that the line which in plan represents a vertical plane may be taken as a new GL, in order to determine the distance to right or to left of any shadow cast upon that plane by a point or line; and that any line which in elevation represents a horizontal plane may similarly be used to determine the distance to right or left, of any shadow which it receives. We can thus easily find any shadow or set of shadows falling upon any horizontal surfaces, or upon any vertical surface parallel to $V'P$. Shadows falling upon irregular, curved, or oblique surfaces are reserved for later discussion.

64. These discussions have so far related only to shadows cast upon coördinate planes by points, lines (especially principal and diagonal lines), squares and "lozenges," with their diagonals; octagons and circles, pyramids, cones and cylinders. But these rules and discussions are in themselves sufficient to enable us to cast the shadows of nearly all architectural objects presenting plane surfaces of incidence parallel to HP or $V'P$. This statement is exemplified by Plate III, in which Nos. 1 and 2 show a porch in front and side elevation, and in plan, with the shadows. The processes by which these shadows are cast will be given in detail in the latter part of this chapter; our purpose at present is to show how large a part of the problem is solved by means of the simple rules already laid down for the lines and figures enumerated in the opening lines of this paragraph.

65. 1. *Figures parallel to the plane of incidence*, casting shadows parallel to themselves, occur in the lower edges, respectively, of the corona of the main cornice; of abaci of imposts, and of all

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[1] By A. D. F. Hamlin, Instructor in Architecture in the School of Mines, Columbia College. Continued from page 11, No. 706.

NOTE. — [In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

HP = horizontal plane of projection; $V'P$ = vertical plane of projection; GL = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow: small figures above the line indicate points of shade. Greek letters (α, β, γ, θ, δ,) designate angles. The *diagonal* of a line or dimension is its length multplied by $\sqrt{2}$.

fillets and belt-courses generally on the front of the elevations of the porch. Their shadows fall mostly on the front wall of the porch, and are parallel to the edges that cast them. Those portions which do not fall upon the porch itself are cast upon the main wall of the building, and are, therefore, still parallel to the edges that cast them, as for example $a'_2 b'_1$ and $b'_1 c'_1$ cast by the right-hand end of the lower edge of the corona, and by its right-hand vertical corner. Other examples are the shadow of the archivolt (both of its extrados and of its intrados) upon the porch-front; of a small portion of the main arch upon the front of the main building; of the vertical corners of the porch and its piers, upon the same wall, and of the stair-parapet upon the risers of the steps. In the plan, where the piers are supposed cut off at a certain level above the landing, the top-surface of the left-hand pier casts its shadow parallel to itself on the landing, and the top right-hand corner of the stair-parapet casts shadows parallel to itself on the third and fourth treads of the steps below.

2. *Lines normal to the plane of projection* appear in the elevation in the upper edges of the cornice and of imposts and belt-courses returning back to the main wall, and in the edge of the stair-parapet returning back towards the landing. The shadow of the most important of these forms the upper line of the shadow cast by the porch on the main wall from which it projects, and there are several other shadows cast at 45°, very short but important, which form the upper limits of the shadows of the right-hand corners of imposts, fillets, belt-courses, mouldings, etc. In the plan, the shadows of the corners of the piers and that of the front edge of the stair-parapet, are in the same way cast at 45° across all the various surfaces of incidence on which they fall.

3. *The shadow of the square* is made use of to assist in finding that of the circle, and both of these are, therefore, employed in finding the shadows cast by the small side-arches of the porch upon the main wall of the building; and again, in drawing the shadows of the circles which appear in the design of the iron railings under those arches. The method briefly described in 57 for delineating geometrically the length and inclination of the axes of the circle's shadow, here comes into use when any considerable accuracy is desired. The circles in both these cases are in profile planes (52), and the side-elevation is needed as an auxiliary to determine their exact dimensions and position in front-elevation.

4. The diagonal-bars of the railings just mentioned are *diagonal lines in the profile plane*, and their shadows are seen to agree with those given in Figure 43, C.[1]

66. The practical work of casting the shadows of even a simple architectural object like the porch shown in Plate III, involves difficulties of detail and of procedure to which it is worth while to call attention, as points of general interest. The most important of these relate to the lines of shade, which are the key to nearly every difficulty which the draughtsman encounters. *It is important to be able always to identify the portion of the line of shade, which corresponds to each part of the shadow, and vice versâ;* for since the whole line of shade must cast its shadow somewhere, the shadow of an object has not been completely drawn till every part of that line has been accounted for. Consequently when the shadow cast upon one plane belongs to only a part of the line of shade the remaining part of the shadow must fall upon some other surface. Sometimes this is a profile plane (such as the jamb of a door or window, or the side of some projecting mass or feature), in which case it is not visible either in plan or in elevation; but the great majority of architectural shadows fall upon vertical and horizontal planes, so that whatever part of the shadow is not visible in elevation must come into view in the plan, and *vice versâ*. Now the point where it passes from one plane to the other (as from one tread of a flight of stairs to the face of the next riser above or below) being a point of the intersection of the two planes, appears in both plan and elevation, so that by marking all such points and working backwards and forwards between plan and elevation, the shadow may be traced continuously from surface to surface, until the whole line of shade is accounted for.[2]

67. In the next place it should be observed that while the line of shade of any simple solid is always a continuous line, the line of shade of an architectural feature made up, like a capital or a cornice, of several simple solids combined, is often discontinuous or made up of the several distinct lines of shade of its various component parts. The extremities of these separate lines of shade are so connected together, however, by rays of light, that they cast a continuous shadow. Whenever the line of shadow of one part *A* falls across the line of shade of another part *B*, the intersection of these two lines is at once a point in the second line of shade, and the shadow of a point in the first by which the latter (the line of shade of *A*) is divided into two parts, one of which, as just observed, casts its shadow on *B* itself, while the shadow of the remainder falls on the main surface of incidence. The shadow of *B* upon the same surface joins on to this, and together they form the continuous shadow of the solid. *Thus the point of junction of these two shadows is the common shadow of a point in each line of shade,* the three points being connected together by a single ray. If then we pass a ray through the intersection of the shadow of *A* with the line of shade of *B*, the point where this ray meets the line of shade of *A* divides the part whose shadow falls on *B* from that which casts its shadow on the general plane of incidence. And the point where the other end of the same ray terminates in the continuous line of shadow of the solid separates the part which belongs to the line of shade of *A* from that which belongs to the line of shade of *B*. Thus in Figure 56, representing a Tuscan cornice, b' is at once a point of the line of shade $a' b'$ and the shadow of the point b' on the line of shade $b' c'$, which line is thus divided into two parts, that to the left of b' casting its shadow on the frieze, and that to the right on the main surface of incidence to form a part of the continuous shadow of the cornice. And both b'_1 and b' cast a common shadow at b'_2, which divides the shadow of $b' c'$ from that of $a' b'_1$, a *continuous shadow being thus cast by two distinct lines of shade connected by a ray of light.*

68. It is important to dwell on this ray of light and the point of intersection of the shadow with the line of shade, because many of the difficulties of shadow-casting disappear if, proceeding from such points of intersection, we at once determine what portions of each line of shade cast their shadows on one and what on another of several planes of incidence.

In the same way by observing the ray $b' b'_1 b'_2$ we see that the *distinct shadows cast upon different surfaces by a continuous line of shade, are linked together by rays of light*, as in Figure 56, the ray $b' b'_1 b'_2$ connects the separate shadows $c'_1 b'_2$ and $b'_1 x'_1$, cast by the continuous line of shade $c' b' x'$. And a careful study of the lines of shade in this figure, and of the shadows they severally cast, will explain how and why the shadow of a cornice differs in profile and dimensions from the profile of the cornice itself.

69. Thirdly, any limited surface of incidence may be supposed indefinitely extended, so as to receive the whole shadow of a given line of shade, all intervening objects being supposed removed, because it is often easier to draw the whole shadow of an object and then discard all but that portion found to lie within the limited surface of incidence, than to go through the somewhat tedious process of finding exactly

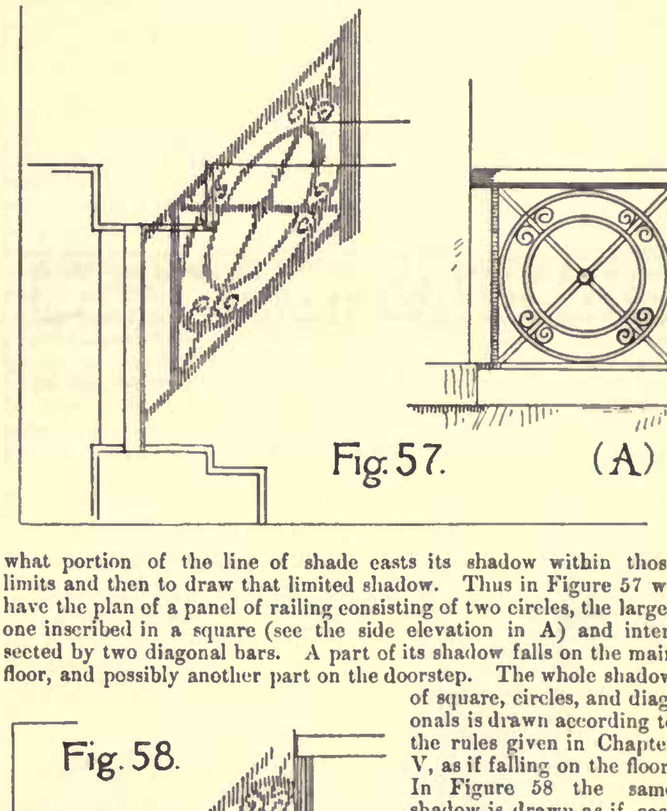


Fig. 57. (A)

what portion of the line of shade casts its shadow within those limits and then to draw that limited shadow. Thus in Figure 57 we have the plan of a panel of railing consisting of two circles, the larger one inscribed in a square (see the side elevation in A) and intersected by two diagonal bars. A part of its shadow falls on the main floor, and possibly another part on the doorstep. The whole shadow of square, circles, and diagonals is drawn according to the rules given in Chapter V, as if falling on the floor. In Figure 58 the same shadow is drawn as if cast on the plane of the doorstep, or sufficiently drawn out to show that no part of it would really be cast upon the step, the pier of the arched door intervening and evidently receiving what otherwise would fall on the plane of the doorstep. That portion of the shadow still unaccounted for obviously falls on the front or riser of the doorstep. Figure 59 shows the completed drawing, with the shadows of the piers falling across a part of the railing, and consequently swallowing up a corresponding slice of its shadow from *a* to *b*, or cast across the shadow only of the railing as at *c*, the pier in this case itself receiving that part of the shadow of the railing which otherwise would be seen at c. These figures resume, in duplicate, the operations performed in Plate III, No. 2,

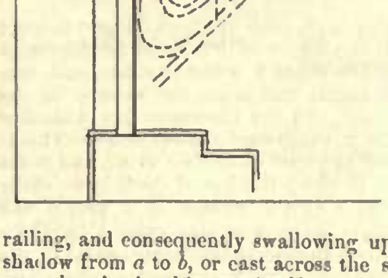


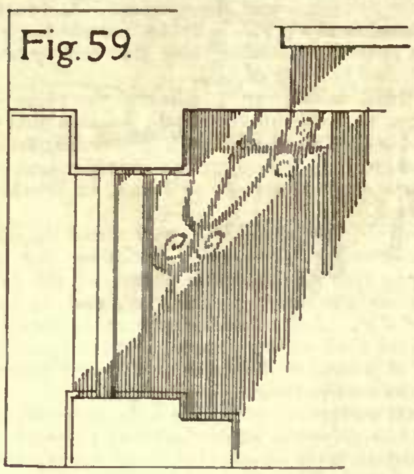
Fig. 58.

See No. 706, for July 6, 1889.

[2] In Figures 37 and 38 (issue of May 11, No. 698), this operation may be traced both in elevation and in perspective.

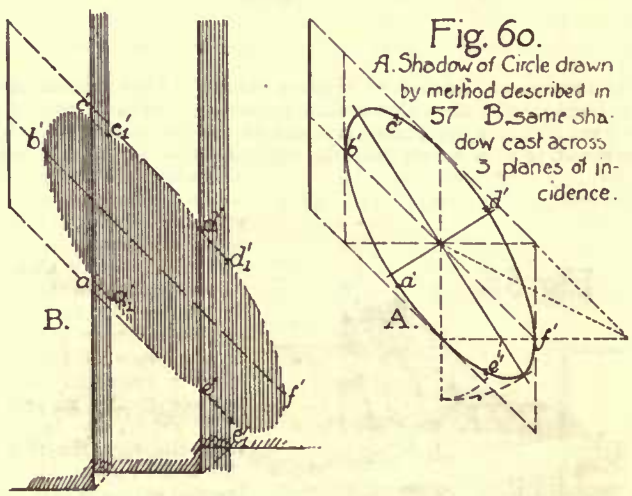
where the railing and its shadow are easily recognized; while in the elevation, No. 1, we see on the front of the doorstep the part of the shadow next adjacent to that which appears in the plan — the dotted lines showing that portion of this shadow which in reality is hidden by the front pier of the porch.

70. This method of procedure is one of the most commonly employed devices for correctly drawing broken shadows, that is, shadows falling across several surfaces; and it is important to observe that *when the various surfaces of incidence are parallel planes, the shadow, having been once outlined for one of them, may be transferred to or traced successively upon each of the others*, or (if tracing-paper is used) so much only as falls upon each surface may be traced each time from the original outline, care being taken that the successive shadows shall form consecutive parts of that outline. Thus, in Figure 60, the shadow of a circle falls on three successive planes, all parallel to VP; the ellipse of its shadow may be drawn as though falling on some assumed vertical plane. The nearest plane is seen to receive only $a'b'c'$; the next segment, beginning with the points a' and c', falls on the next plane from c', to d', and from a'_1 to e', and the remainder on the third surface from d'_1 through f' on to e'_1. These three segments of the shadow of the circle, taken together, should form the complete ellipse, $a'b'c'd'f'e'$, shown at A.



71. The converse of this operation is also very useful. When it is not evident at sight where the shadow of a given right line may fall, the line may be prolonged in either direction until some portion of its shadow falls upon a given surface, from which it can be traced over and across the other surfaces it encounters, and that portion only retained which is comprised between rays drawn through the extremities of the given line. So the shadow of an arc of a circle may be easiest found by completing the circle, or, at least, the semicircle, and casting its shadow, from which one can then cut off and retain so much as is contained between the rays drawn from the extremities of the arc. Thus the shadow of a cusp, of a segmental arch or of the outline of a Gothic arch, may be easiest drawn by casting the shadow of each of the circles (by means of their centres) of which the various curves of the outline are arcs.

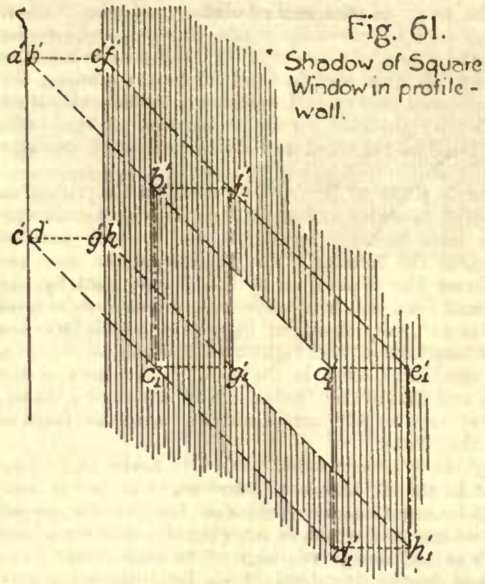
72. We have, finally, to consider the cases of arches and other openings.[1] These have equal and similar edges, one on the inner



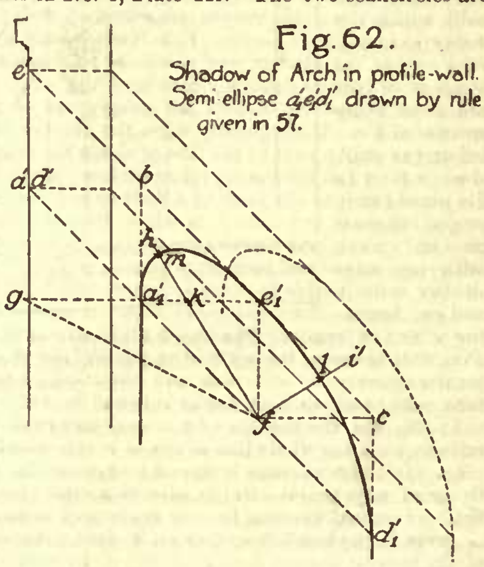
and one on the outer face of the wall, each of which in part belongs to the line of shade. Since it is not easy to determine by inspection just what portion of each of these edges is a line of shade, and, consequently, where its shadow begins and ends, the shadow of the whole of each line or edge is cast, and the innermost line of shadow is retained as the final outline of shadow of the openings. This is an application of the "reverse process" described in 62, and is the best way to treat all problems in which the line of shade is not easily ascertainable. Let us suppose a square window in a profile wall (Figure 61). Each of its edges, being a square, casts a parallelogram of shadow on the wall, as shown in the figure, and the two shadows (parallel to each other, and separated by a constant distance, equal to the thickness of the wall) intersect, leaving a smaller parallelogram of light, whose outline is the shadow of the window. Those parts of either edge of the window whose shadows appear as dotted lines, are either in shade themselves or cast their shadows on the jamb or sill of the window.

[1] The "shadow" of an opening which admits light is not a misnomer, as it might at first appear to be. It is an outline of shadow which is surrounded by the shadow it limits, instead of inclosing it, and is truly cast by the line of shade of the window or opening.

Plate III, No. 3, shows this principle applied to the square window, in section, in the profile-wall and to the gallery. The same principle is used in the case of the arched window in the same drawing, and this application of it is worthy of careful study.



73. The inner and outer outlines of an arch are equal and similar figures, and form the bases of a semi-cylinder having equal horizontal elements. The shadows of these two equal, similar, and parallel bases are equal and similar curves, whose corresponding points are connected by the shadows of the horizontal elements of the cylinder. When the wall containing the arch is parallel to the plane of projection, the shadows of the two edges of a semicircular arch are semicircles, with their corresponding points connected by lines which are the shadows of the horizontal elements of the arch-soffit. These elements, being normal to the plane of projection, and their length equal to the thickness of the wall, their shadows are cast at 45°, and are equal to the diagonal of the wall's thickness; so that *the constant distance apart of the shadows of the two semicircles, measured horizontally or vertically, is equal to the thickness of the wall;* measured directly between corresponding points, it is equal to the diagonal of that thickness. This is illustrated by the shadows of the arches in No. 4, Plate III. The two semicircles are usually drawn by first locating the shadows of their respective centres.



74. When the arch is in a wall at right angles with the plane of projection, the shadows of the two semicircles are ellipses, drawn by Rule (VIII); and the elements of the cylinder, or arch-soffit, being parallel to the plane of projection, cast shadows upon it equal and parallel to themselves. *Hence any pair of corresponding points of the two semi-ellipses are on the same horizontal line, at a distance apart equal to the thickness of the wall.*

In Figure 62 we have the vertical projection of a profile-wall containing a semicircular arch, whose radius and position are sufficiently indicated by the dotted lines which mark its impost and crown. No side elevation is, therefore, required in order to cast the shadow. Taking, first, the outside semicircle, and following Rule (VIII), we cast the shadow $a'b'c'd'$ of the half-square circumscribing it, and find the centre e'_1 of its long side. The half-ellipse of the shadow of the circle passes through a'_1, e'_1 and d'_1, tangent to the parallelogram at those points. If great accuracy is required, we employ the method given in 57. Laying off a horizontal line from a'_1 to the left equal to $a'_1 b$, we have at g one corner of the shadow of the half-square perpendicular to that circumscribed about the semicircle, and fg is its half-diagonal. Bisecting the angle e'_1fg, we have in the line fh the direction of the semi-major axis, and in fi, at right angles to it, that of the semi-minor axis. The segment e'_1k, cut off from e'_1g by this major axis, gives us the length of the semi-minor axis, which we lay off with the dividers, giving l as a new

point of the curve; and adding the same to $e'_1 f$ (which equals radius of the arch), we have the length of the semi-major axis, which we mark off at *m*, a fifth point of the curve, of which we now know five points and its direction at each, and the length and inclination of its axes. These operations may be performed upon tracing-paper, and the resulting curve alone transferred to the drawing, as in Figure 63.

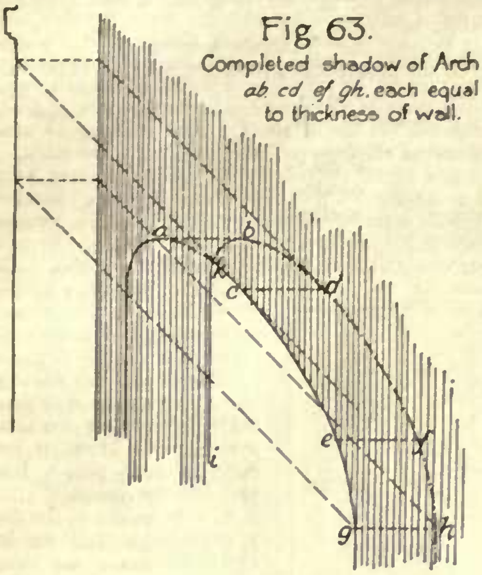


Fig 63.
Completed shadow of Arch. *ab, cd, ef, gh*, each equal to thickness of wall.

Now the shadow of the other edge of the arch is precisely similar and equal to this one, so that if we have its centre or any point of it, we can trace the same curve in its new position; and as we have seen that the two curves are everywhere at a constant horizontal distance apart equal to the thickness of the wall,[1] it is an easy matter to trace the second curve from the first in its proper position, as shown in the figure, where *ab*, *cd*, *ef*, and *gh* are each seen to be equal to the thickness of the wall. The inside line *ikceg* is the required line of shadow, the dotted lines being the theoretical shadows of those portions of the two edges of the arch which are in shade, or whose actual shadows fall across the soffit of the arch itself, as in Figure 64. Here only half the arch appears, it being in section. The lines of shadow of the whole arch are drawn and cut off at the shadow of the crown, the horizontal element at this point, with one edge of the wall in section, becoming a line of shade. The shadow of part of the outer edge from *d'* to *b'* falls across the soffit of the arch, and that of the next consecutive portion, *d' e'*, is cast upon the main plane of incidence to form part of the final outline of shadow.

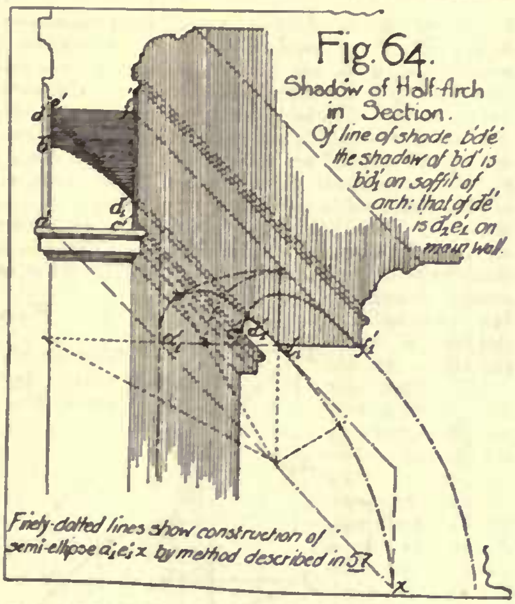


Fig. 64.
Shadow of Half-Arch in Section.
Of line of shade *b'd'e'* the shadow of *b'd'* is $b'_1 d'_1$ on soffit of arch: that of *d'e'* is $d'_2 e'_1$ on main wall.
Finely-dotted lines show construction of semi-ellipse $a_1 e_1 x$ by method described in 57.

In all cases, the *position* of the shadow of the arch may be determined by casting the shadow either of its centres or of one of its piers, for which purpose either the plan or the side-elevation must be consulted whenever its distance from the plane of incidence cannot be assumed arbitrarily. In the porch shown in Plate III the shadows of the two side-arches are found in this manner.

(To be continued.)

LIGHT LOST IN WINDOWS. — The loss of light in passing through glass has been tested by two physicists of Berlin. A simple translucent but not transparent glass diminished the light 27 per cent; cathedral-glass, both white and with a slight ground-tint, 12 2-3 per cent; plain white Rhenish "double glass," 10 per cent; and plain thin mirror glass, 10 per cent. Ground glass with cut stars and a white glass background, such as is found in house fanlights, obstructed 60 per cent of the light; and plain ground glass with the background, 40 per cent. — *Worcester Gazette.*

[1] There is no term in mathematics for the relation of two similar and equal curves whose homologous points are all each from each equidistant. On the other hand, the terms *parallel* and *concentric* are applied interchangeably to curves having common centres of curvature. Were it not that usage has so thoroughly established this use of the two words, it would be far more correct to call two curves *parallel* when their distance apart, measured always in the same direction, is constant; so that the two words would mean entirely distinct things, and both relations would have mathematical names.

BITS OF BURGOS CATHEDRAL.



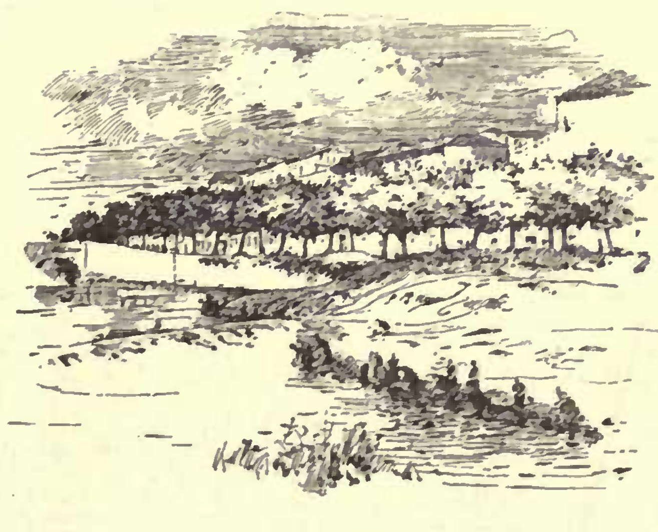
"WHEN a traveller returneth home, let him not leave the countrie where he hath travelled altogether behind him, but maintain a correspondence by letters with those of his acquaintance which are of most worth," saith the great philosopher.

And there were at least three in Spain with whom I would fain maintain correspondence. One of these was the *capellan* of a little chapel in Cadiz; another a noble priest who had devoted his spare time to photography and who placed at my disposal his dark-room and his learning, Don Juan Navaja; while the third was my one-time landlady, Doña Dolores, *Viuda de* Garcia, of Madrid.

Don Juan lived in Seville, but he could not have been the original of Byron's hero, either by birth or inclination, for he was pure-minded and honest, with a rugged sincerity that won you and held you.

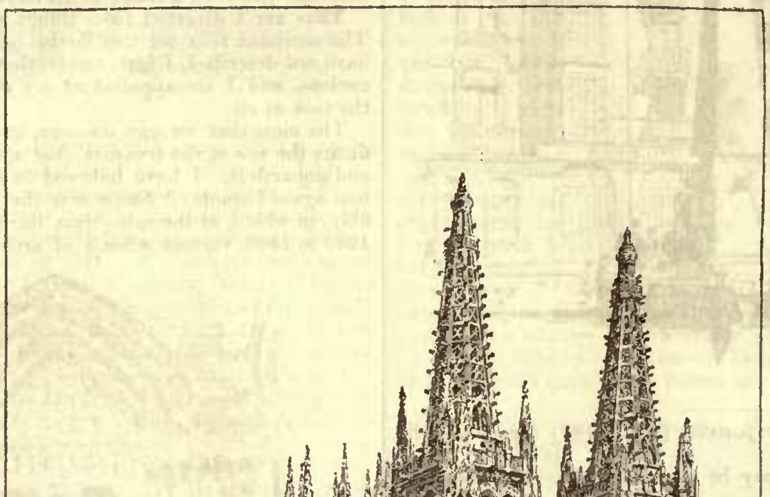
As for Doña Dolores, the widow of the late lamented Garcia, it was not my admiration for her domestic qualities, though they were great, nor for her majestic presence, though it was that of the ideal matron of Rome; but her speech, that captivated me. Much may be learned from widows, as we all know — or ought to know — but it is not my intention to tell what I know about widows, only to mention that this particular one spoke the Castilian in all its purity. And this brings me around to Burgos, for in Burgos she had learned to turn those sonorous periods.

"You must go to Burgos, Don Federico, and there learn the Spanish; not the bastard speech of Andalusia, with its many Moorish words, but the pure Castilian of the Cid and Saint Ferdinand." I took the widow's advice (which was disinterested, as she was my landlady) and went forthwith to Burgos. Doña Dolores had not mentioned other attractions in Burgos, but I knew they were there, having dutifully studied my guide-book, and when the two open-work spires stood up against the leaden morning sky I knew they pertained to one of the grandest Gothics in Castile. Resolved that the city's treasures should not be sprung upon me unprepared, I repaired first to a hotel, as it was then five o'clock in the morning, and was shown to a room by a buxom damsel. After a three-hours' rest, and cup of coffee, I went out to make the treasures of Burgos my own. The city is, to-day, the city of the Cid, whose bones are preserved, in a fragmentary condition, in the city-hall; and of Saint



Ferdinand, who flourished some six hundred and fifty years ago; and of Fernan Gonzalez, a great hero, born exactly one thousand years ago; and of Diego Porcallo, Count of Lara, ancestor of the Cid; and of the beautiful Princess Sancha, whom Count Fernan brought

home, so triumphantly, as his bride. You feel that it is still the city of these ancient worthies, because so many memorials of them abound on every side, not only in the shape of statues, erected by grateful Burgalese, centuries ago, and in fountains; but the great city gate, the archway of Santa Maria. It is certainly a relic of the Middle Ages, with its battlements and flanking mural bastions. The oldest relic of ancient Burgos is to be found in the city-hall, — in the room containing the bones of the Cid, — that famous Roman or Gothic chair, used as a seat-of-justice over a thousand years ago. As you go down the street towards the market-place, about the fountain of which the beggars cluster like flies, you see the noble *casa del cordon*, with its *cordon* over the great doorway and rude stone statues on its walls. This was a house of one of those valorous Counts of Castile who made Burgos celebrated as the dwelling-place of real Gothic heroes. There was never a warrior, of course, like the Cid, *El Cid Campeador*, who was born here in the year 1026, and the site of whose house is still shown, indicated by rude monuments. It is a question whether Burgos is prouder of the Cid than of her great cathedral; but there is no question whatever as to which has to-day the nobler presence.



Burgos Cathedral. From "*Encyclopédie de l' Architecture et de la Construction.*"

The cathedral, certainly, may not outlive the Cid; but it is a concrete fact, while the hero is, even now, being looked upon by some as a myth. Ferdinand the Saint is said to have laid the foundation-stone of Burgos Cathedral, in the year 1221. It probably surpassed the expectations of its founders, and out-grew the original plan, else why should they have set it on a side-hill and why should their successors have allowed surrounding buildings to obscure its grand proportions by their contiguity? To secure a photograph of the cathedral-spires I had to climb to the garret-window of a tall house opposite, even though I had a wide-angle lens, — one of Darlot's latest. Nothing can detract from the exquisite beauty of its twin towers, three hundred feet in height, with lace-work structure so open that the stars may sometimes be seen through them, at night. The principal façade of the cathedral looks west, with three portals and two high towers, a most ravishing rose-window, and a turreted balustrade-corridor.

The structure of the cathedral is three hundred feet in length by two hundred in breadth, contains two hundred windows, seven stairways, nine fonts, nine choirs and lecterns, sixty tombs, ten confessionals, forty-four altars, one-hundred and forty paintings, and nine organs. Of statues and statue-groups there are more than one has time to examine, both outside and in, the lateral towers alone being encircled by no less than seventy.

Burgos Cathedral, in its design and general features, is purely Gothic, with central nave and side-aisles, transept, dome, lantern, choir and apsis, but with its outlines somewhat confused by the contiguous chapels, cloisters, and the Archbishop's palace. Of its purity, Street remarks, in his "*Gothic Architecture of Spain*," "There is little, if anything, to show that we are not in France, and looking at some of its best and purest thirteenth-century Gothic. There is no trace of Moorish or other foreign influence, the whole work being pure, simple, and good." He adds, on the Spanish cathedrals of note: "Just as Cologne Cathedral is an exotic in Germany, so are those of Burgos, Leon, and Toledo in Spain; so that, whilst Spaniards may fairly be proud of the glory of possessing such magnificent works of art, their pride ought to be confined to that of ownership, and should not extend to any claim of authorship.

"The demands of those three great churches upon our admiration are very different. The palm must be awarded to Toledo, which equals, if it does not surpass, all other churches in Christendom, in the beauty and scale of its plan — one of the most impressive churches I have seen. . . . But if Burgos Cathedral is far inferior in scale to that of Toledo, and somewhat so to that of Leon in skilfulness of design, it is in all other respects equally worthy of study, and in its general effects it presents far more Spanish than either of them." We know that between the twelfth and the fifteenth centuries the Gothic became the standard of ecclesiastical architecture, passing through its transitional period in the thirteenth century, attaining its acme in the fourteenth, and becoming Flamboyant, or "Orientalized," in the fifteenth. And in Burgos Cathedral we find an epitome of all these periods in which it was built.

Let us now enter this grand cathedral; but before we enter let us notice the internal arrangement, prevailing in all Spanish churches.

"The *coro*, or choir, is transferred to the nave, of which it occupies commonly the eastern half, the portion outside and west of the nave being called the *trascoro*, and to the east, between the choirs. Beneath the dome, the lantern or *cimborio*, is the *crucero*, or crossing, which with the transept is usually occupied by the people, the worshippers. A passage sometimes leads from *coro* to altar-screen, with brass or iron rails, to keep people from pressing the clergy.

"In the centre of the *coro* are usually two or three lecterns, for the great illuminated office-books. High metal screens are placed across the nave, — to the east of the *coro* and across its entrance, and these screens are called *rejas*. Behind the altar is a great sculptured altar-screen, or reredos, called a *retablo*."

The church furniture, also, is of the usual sort, though not so magnificent as it was before the French invasion, some eighty years ago.

Of the entrances, it seems those of the transepts are richest in sculpture; that of the transept-doorway known as the Puerta del Sarmental, being (the sacristan assured me) of the thirteenth century. It is profusely adorned with statuary. In the tympanum is a seated figure of our Saviour surrounded by emblematic images, and the archivolt thickly covered with seraphs and cherubim, some forty-five in number. Statues of Moses and Aaron, Peter and Paul, flank either side the doorway. But the side-entrance, opposite to the transept, known as the Puerta de la Pellegeria, is worthier of description, since it presents, perhaps, one of the finest *plateresque* studies in Spain. This *plateresque*, as we know, was a revival of the Cinquecento of Italy, called, in Spain, *estilo plateresco*, or style of the silversmiths, from the exquisitely-chiselled sculpture. On either side of this doorway are statues of the saints, and, in two square compartments above, the martyrdom of saints, John the Evangelist and the Baptist; above, again, the Virgin and child, a life-size bishop one side and angels the other. The Puerta Alba gives entrance at the opposite end of the transept, and, as it is about thirty feet above the pavement, a sixteenth-century staircase in the Gothic Renaissance leads to it. It adorns well the wall against which it is affixed, but does not strike one as in unity with the structural design of the building. The balustrade is of that exquisitely-wrought ironwork we find in the *rejas*, and all of the sixteenth century. Each of the fifteen chapels is adorned with an enormous *reja*, or high gate of ornamental ironwork.

I rambled through the cathedral under guidance of the sacristan, a young man of noble mien, who took an intelligent interest in the stranger at his side, and was delighted to point out the hidden beauties of the place, such as the obscurer carvings and earlier tombs. He led me to the choir, seated me in a favorable light, and

then called my attention to the carvings of the *silleria*, or choir-stalls, profusely ornamented, and over one hundred in number.

These carvings call to mind those in the Toledo Cathedral, but are not their equal. The carvings of foliage in the early work (of Burgos), says an authority, is good and very plentiful. The figured sculpture is still richer, and, whether in the thirteenth-century transept-doors, the fourteenth-century cloisters, or the fifteenth-century *retablos*, is amazingly good and spirited.

And he adds: "In sculpture, Spain is not so rich as France, but, on the whole, probably more so than England. Perhaps the triple

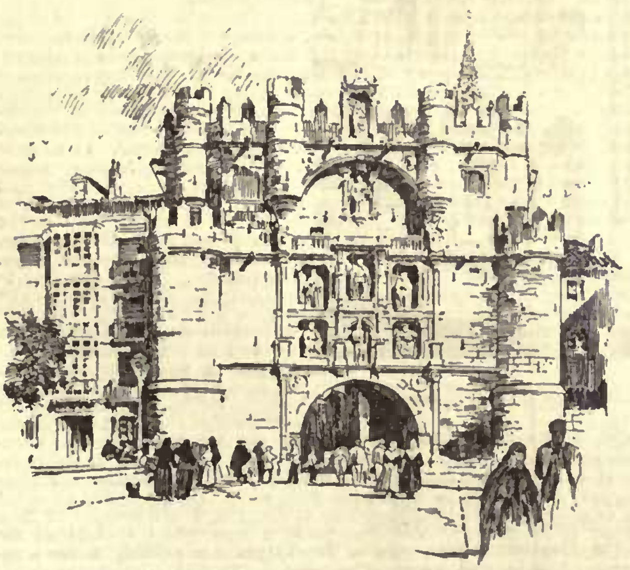


western doors at Santiago Compostello (date, 1188) are among the first works of their age."

These doors, by the way, may be seen, reproduced, at the Kensington Museum.

The high-altar, opposite the *coro*, contains some richly-sculptured forms, but is not notably distinct from a score of others in Spain, and we turn to the surrounding chapels. These number fifteen, and are mainly the gifts of noble families. By far the richest and most important is the Capilla del Condestabile, the chapel of the constable, Don Fernandez de Velasco, once viceroy of the great King Ferdinand, who was conspicuous at the siege and conquest of Granada, and whose *escudos*, or arms, are wrought upon the walls, guarded by skin-clothed savages.

These sculptures are highly wrought and fascinating, though grotesque, and are of the fifteenth century. Conspicuously beautiful,



are the effigies of the Count and Countess, who expired at about the time America was discovered, or in 1492 and 1500, respectively. A private chapel, still belonging to the descendants of the constable, is under the exclusive control of a special sacristan, who only gives you admittance for silver. He alone possesses the key that turns the lock in the great *reja*, and no one else can show you the treasures of the inner chapel, where are still preserved the ivory altar carried by the Count to the wars, some jewels, and a "Magdalen" attributed to Leonardo da Vinci. The altar-piece is dedicated to San Geronimo, and the noble Jeremiah is represented as in the desert, extremely haggard and emaciate, while his companion, the lion, shows unmistakable signs of weariness.

Other chapels are not less interesting, though less famous. One, the Chapel of the Presentation, contains an alleged Michael-Angelo, a picture of the Virgin; and another holds a horrible effigy of Christ, said to be covered with human skin, and which is credited with miracles innumerable.

Tombs there are, of all ages and in every style of carving, from the archaic sculpture of Bishop Maurice, beneath the choir-lectern (the founder of the cathedral, and who died here, 1240), to that of the latest bishop. But most of them are at least four hundred years old, and the year 1492 is a recent date.

From the gloom of the cathedral we turned to the sky-lighted cloisters, so rich in lancet and trefoil, and, at that time, hung with extraordinary tapestries of the fifteenth and sixteenth centuries. Fresh of color, tenacious of texture, these *tapices* seemed to have been not long ago woven and presented to the church. Chapels, again, are here, opening out of the cloisters, and one of them still holds that treasure unique, affixed against its northern wall, the veritable trunk of the Cid. Imagine a trunk (*cofre*) eight hundred years old, and try to imagine the joy of an American baggage-smasher with such a trunk at his mercy!

Thus am I diverted from things ecclesiastical to things secular. The sacristan tells me this is the last relic he has to show; yet I have not described, I fear, one-tenth the treasures these noble walls enclose, and I am appalled at my own presumption in attempting the task at all.

The most that we can do — or, at least, that I can do — is to indicate the site of the treasure, that others may follow in my footsteps and unearth it. I have followed in the footsteps of a master, and him again I quote: "Spain was the only country in Europe, probably, in which, at the same time, during the whole period from A. D. 1200 to 1500, various schools of architecture existed, much as they



do in England at the present day. There were the genuine Spanish-Gothic churches (derived, of course, from Roman and Romanesque); the Northern Gothic, executed by architects imported from France, and, in later days, Germany; and the Moresque buildings by Moorish architects for their Christian masters."

Two miles distant from the cathedral, walking along the banks of the river Arlanzon, beneath the shade of innumerable trees, I find the convent of Miraflores, or the *Cartuja*, as these Carthusians are generally called in Spain. Its altar-piece is said to be gilded with the first gold brought by Columbus from America, for it was erected by Isabella the Catholic at the time those great discoveries were being made. Here are tombs, declared to be the finest in Spain, perhaps in all Europe, in their carvings: alabaster and marble cunningly wrought by the silversmith's chisel into forms of beauty unsurpassed. A kneeling figure of the infant Don Juan is surrounded by lace-like carving of flowers and foliage intertwined. The *sillerio*, the choir-stalls, are only surpassed by the towering Bishop's Chair, rich examples of what the masters of the world in those days wrought from wood.

Three miles away, at the opposite side of the valley, another convent, Las Huelgas, points a stone spire skyward. A more beautiful rose-window than that of Las Huelgas is not found, they say, in Spain. This convent was founded and sustained by ladies of noble birth, and only those of gentle breeding could enter here. To-day, even, the faces that peer through the gratings are those of noble nuns, and Castilian youths swear yet by the Gothic virgins of Las Huelgas.

Few monks are left within Cartuja's walls. A single *frate* guided me about, silent and wan. From his girdled waist hung clanking keys, but no other sound than theirs awoke the stillness within the cloistered walls; no brother greeted him or me. I went outside and sat beneath the cross. It was then the sunset hour, and over the hills came flocks of sheep, their tinkling bells sweetly breaking the silence of the place. They were received within the gate, the shepherd leaned his staff against a stone and disappeared. A golden cloud spread itself over valley and plain beyond, gilding tower and spire and ancient castle-wall, and night came peacefully then upon royal Burgos.

FREDERICK A. OBER.

SOCIETIES

PREAMBLES AND RESOLUTION PASSED BY THE NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

Whereas, It has been proposed to encumber with additional buildings the contracted limits of the City-hall Park, already too small a breathing space for the concentrated population which lives in its vicinity; and

Whereas, It would seem to be inconsistent for the city of New York to be appropriating land for building purposes which our forefathers intended for a park, while it is acquiring land in less populated districts for park purposes; and

Whereas, A large portion of the City-hall Park has already been taken for the Post-office, and a proposition has been officially made[1] to establish the New York Custom-house in the Battery Park; thus, with other instances, actually and prospectively accumulating very unfortunate precedents; therefore

Resolved, That we, as individual citizens, and in our corporate-capacity as architects of the New York Chapter of the A. I. A., deprecate such encroachments on the rights of the people for whom the park was made; and think that the city of New York is able to and should acquire other property for its buildings.

A true copy, A. J. Bloor, *Secretary*.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

SECRET WRITING WITH TYPEWRITERS.

Portland, Me., September 19, 1889.

To the Editors of the American Architect:

Dear Sirs, — In your issue of June 8, I notice an article credited to the *Paper World*, "Secret Writing by Means of Typewriters."

"The device requires two typewriters similarly adjusted. They are so constructed that the type can be shifted from their normal position, so that the operator striking the keys in the usual way really writes other letters than those in his copy, forming a cipher copy. The receiver adjusts his machine in an opposite direction, and writes from the cipher copy, and his machine records the letters of the original copy."

To simplify this matter and make the scheme more generally useful, I would suggest that instead of changing the type (and thus making the machine useless for general correspondence) that each operator have discs of paper printed for each key; then by mutual understanding these discs may be placed on any key, and one machine would unravel what the other had written.

Instead of these paper discs, metal or pasteboard cups, with the characters stamped or printed on the bottom, may be reversed over each key, and if made to fit closely, will stay on all right; while they may at any time be removed, so that the machine can be used for general correspondence. Yours respectfully, King.

AN ANALYSIS OF AN EFFLORESCENCE.

Boston, Mass., September 18, 1889.

To the Editors of the American Architect:

Dear Sirs, — This efflorescence was received from Biddeford, Me., and is a case not at all infrequent along our coast, or wherever brick made along the coast are used. Thinking it might be of interest to your readers, I forward you the report to publish if it be your pleasure. Yours truly, Samuel Cabot.

—— ——, Esq.
Biddeford, Me.

Dear Sir, — Thank you for the sample of efflorescence sent me on the 16th inst., which we have already examined.

It proves to be chiefly carbonate of soda, with a little lime and magnesia, and a little of sulphate of soda.

Without knowing the facts I should yet feel almost certain that the bricks from which this efflorescence was taken were made from salt clay, the salt yielding the acid in the burning process, during which process it becomes converted into silicate of soda, which slowly dissolves under the action of the weather, and becomes converted into carbonate of soda when exposed to the atmosphere. Yours truly,

Samuel Cabot.

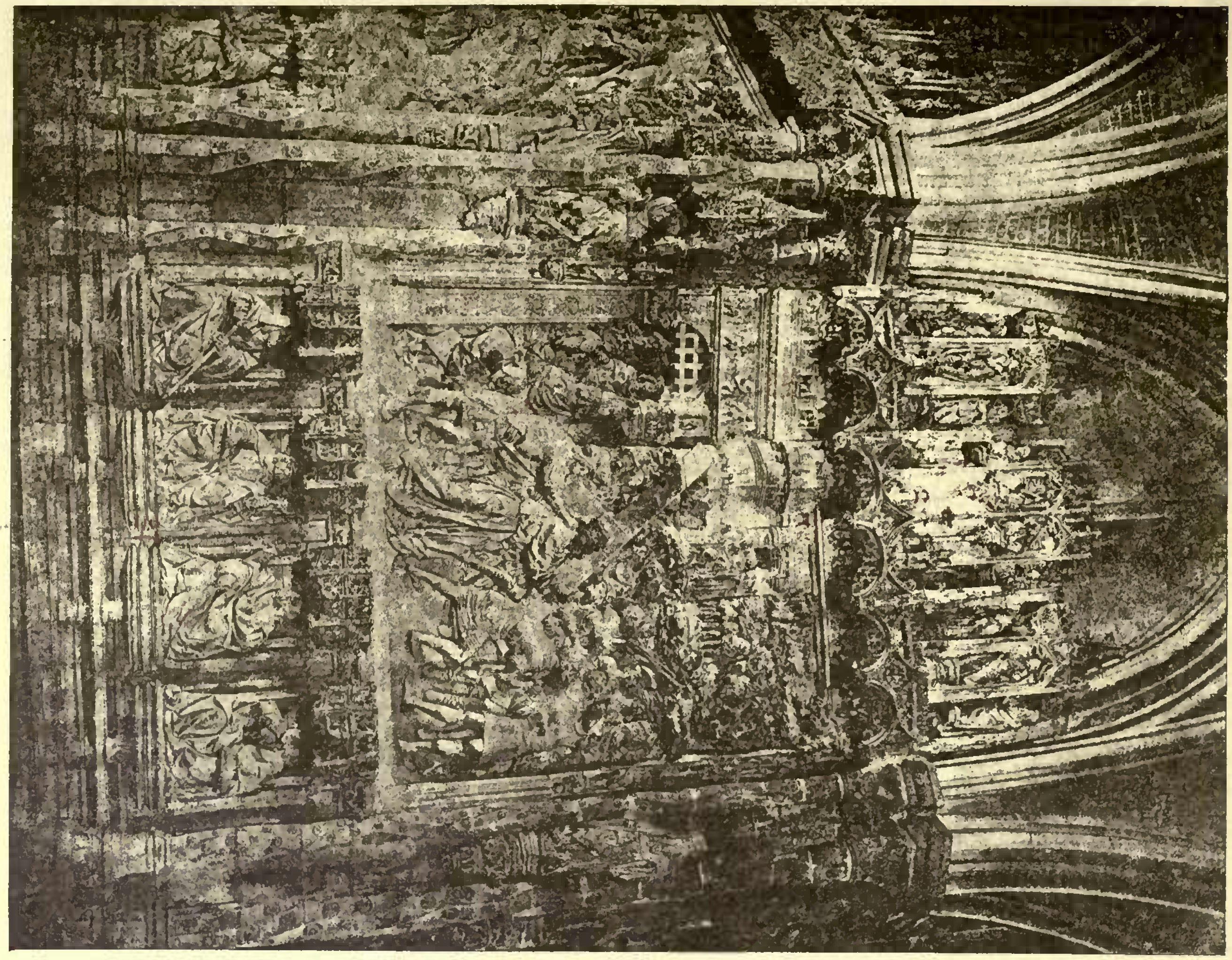
TRADE SURVEYS.

In the mass of contradictory statements made in the daily and commercial and financial journals of the country, it is next to impossible to draw inferences that will bear the test of critical examination concerning trade and business commissions. Either the reports furnished the public press are one-sided and incorrect, or they are, to all intents and purposes, false. It is the earnest desire of parties controlling large operations, whether in railroad operations or in financial journals, to create the most favorable impression upon the stock-buying public. It is the desire of the manipulators of stocks to stimulate buying not only among buyers on this side of the water, but upon the other, and to that end a great deal of information, so-called, and of statistical matter has appeared from day to day and week to week in reputable journals, daily and weekly. At no time for years has it been as incumbent upon investors, especially in large blocks of capital, to carefully investigate and weigh all the surroundings. This statement is not made in view of any actual or even threatened danger to investors, but because of the enormous influx of capital from abroad, which is changing conditions on this side. A great deal of American capital is being rapidly liberated, and will naturally seek new channels of investment. Although the danger is not apparent, or even suspected, by the average financial and economic writer, the fact is, nevertheless, true that this influx on one side and liberation on the other threatens to bring about at some early day a speculative tendency, and, perhaps, an actual speculative era, not only in real estate, but in stocks and in industrial properties. The only object in commenting upon this tendency is to direct attention to the undercurrent, which, like many undercurrents, may remain there, and never appear on the surface to disarrange surface calculations. The immediate and remote effects of this influx of capital will probably be to enable American enterprise to accomplish what it could not otherwise accomplish for years to come. It is a most fortunate occurrence at present, and from very excellent authority it is learned that this financial crusade has only set in. There are a dozen or more negotiations now pending in Eastern cities having reference to the purchase of valuable American properties, some of them involving the purchase of railroad properties; but foreigners are a little apprehensive of the sharp practices of our American railway kings, lest their purchases might be rendered practically worthless by over-reaching financial management of stocks. The fact of the matter is, at least in the opinion of some very eminent economical authorities of this country, that the present influx of capital and the promised influx is averting, and will continue to avert, what they term the possible and even threatening financial stringency. There are not a few very able financiers in this country who regard the extraordinary development of our industries and business with alarm, because of the absence of any permanent and sufficiently elastic financial system. These fears may have very little foundation, but they, nevertheless, exist. They seldom find expression in public print, but in private banking circles the possibility of danger is often discussed. In the business world there is nothing whatever to discourage. It would be difficult to point out an industry in which an expansion of capacity is not in progress. It would be as difficult to find an industry in which there was any accumulation of productions. Distribution was never more uniform and satisfactory. There is not the least symptom of speculation or of over-production, or of a weakening of credit or of a decline in confidence.

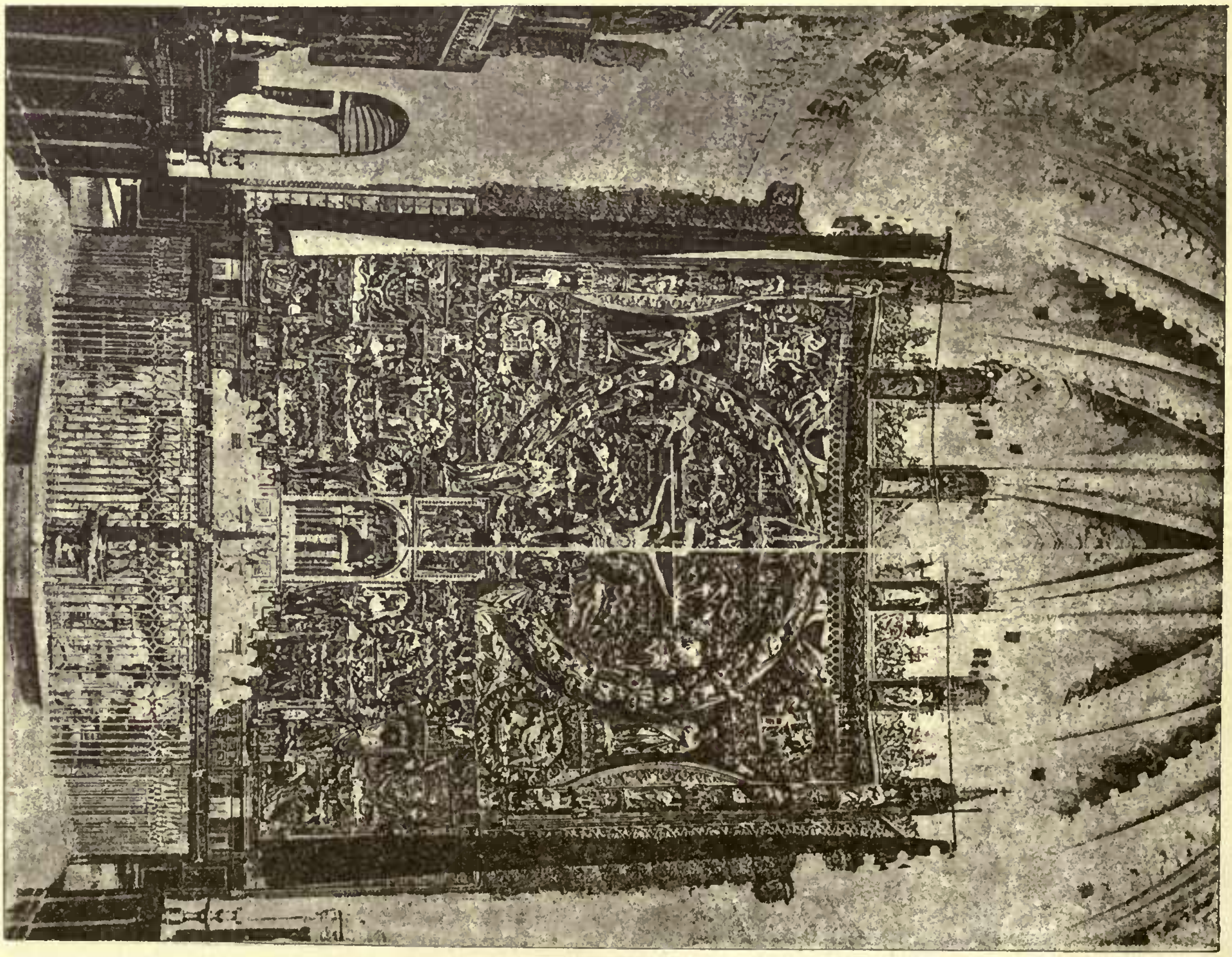
The industries of New England are exceptionally prosperous. In some quarters there is a complaint of lack of labor. In Maine the complaint was recently made that several hundred looms were idle for lack of the usual supply of Canadian labor. In Connecticut and Rhode Island there is no surplus labor, and the various manufacturing interests of this State were never more profitably engaged. There have been times when industrial stocks paid higher dividends, but there never was a time when as much satisfaction existed as to the permanency of good returns. In New York City and State a heavy business is being transacted, and building operations are still almost at their maximum point. The same is true with reference to building operations in the cities farther West. Architects in Philadelphia report a wonderful activity for the autumn season. Similar reports have been received from architects in Chicago, St. Louis and in some of the smaller cities of the far Northwest. The supply of lumber in all markets is very large, and prices are rather sagging notwithstanding the claims of some of the larger manufacturers that a hardening process is at work. So many new sources of lumber-supply have been developed, and so many hundred new saw-mills have been erected that it is unreasonable to expect any higher range of prices. The supply of Southern lumber in Northern markets is very large, and Northern manufacturers are giving vitality to the movement to invest in Southern lumber properties. Extensive purchases of timber-land are being made, and during the past two months some of the finest belts of timber have been purchased by Northern capitalists. In most of these purchases the object is not to realize immediately, but to secure valuable timber for future contingencies. The upward tendency in Michigan and Wisconsin pine seems to have been arrested, but that tendency will be controlled very largely by the progress of building in the far Western and Northwestern States, which look to those two places for lumber-supplies. Turning for a moment to the iron trade, it is found to be in excellent shape. Within six days steel-rails have still farther advanced. This is due, first, to the increasing demand for rails, and to the increasing cost of slab-steel and billets. The prospects in the iron trade have not been better for years, and the winter will be a very busy one for both crude and finished iron and steel. Ship-building and car-building, as well as bridge-building, will absorb much more than the usual winter-supply. It now transpires that a larger amount of railroad-building will be done next year than was done this. It is also evident that the extraordinary demand for all kinds of machinery and mechanical appliances will continue without abatement during the winter. There is also an assurance that the demand for wood-working machinery will be exceptionally active this winter. In other industries there is no evidence of weakening. The textile-goods manufacturers are, for the most part, crowded with work. Congress will be called upon to make some tariff-adjustments this winter in the interest of New England manufacturers. The coal trade is very active throughout the West, but the anthracite region of Pennsylvania is working under a restriction. The manufacturers of supplies for house-furnishing nearly all report a busy year, and factories are now crowded with work for winter-delivery. Manufacturers of wall-paper, gas-fixtures, carpetings and interior decorations have had an extremely busy season since July 1. The shipments of machinery for shop and mill purposes to the Southern cities since that date have been in excess of the shipments of any former-like period. The Southern farmers are successfully combining for mutual protective purposes, and the surplus wealth for outside expenditure from the fourteen Southern States will, according to a rough guess, run from 25 per cent to 30 per cent over last year. Producers in all avenues of activity are aiming at a partial and moderate restriction. In former years the only controlling idea was to make the most possible, and crowd productions upon the market regardless of commercial consequences. That wild management has disappeared, and merchants and manufacturers are now taking a broader and more business-like view, with beneficial results to the country at large.

[1] Several years since by the Supervising Architect of the United States Treasury Department.

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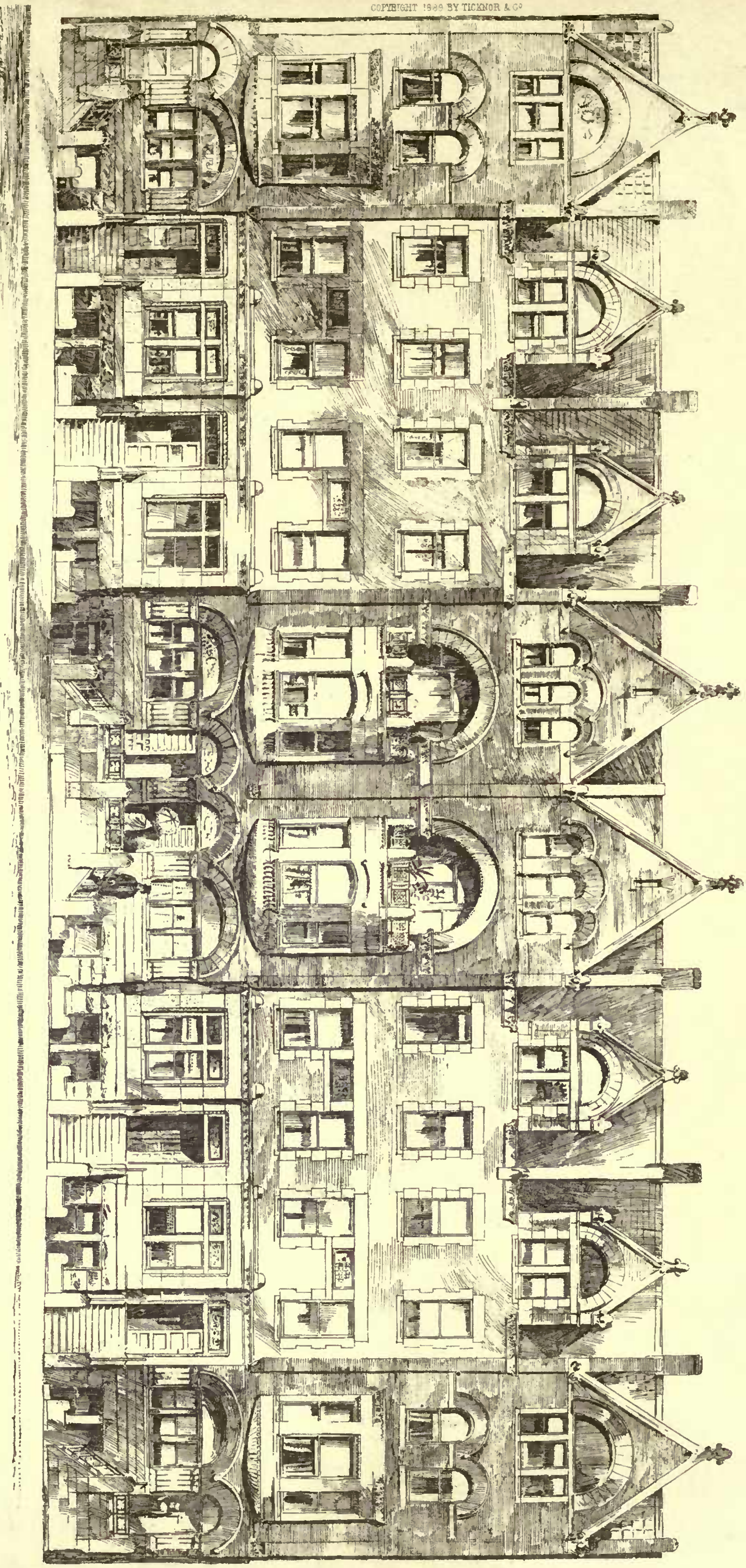


• XVI CENTURY CARVING • BURGOS CATHEDRAL •



• RETABLE • BURGOS CATHEDRAL •

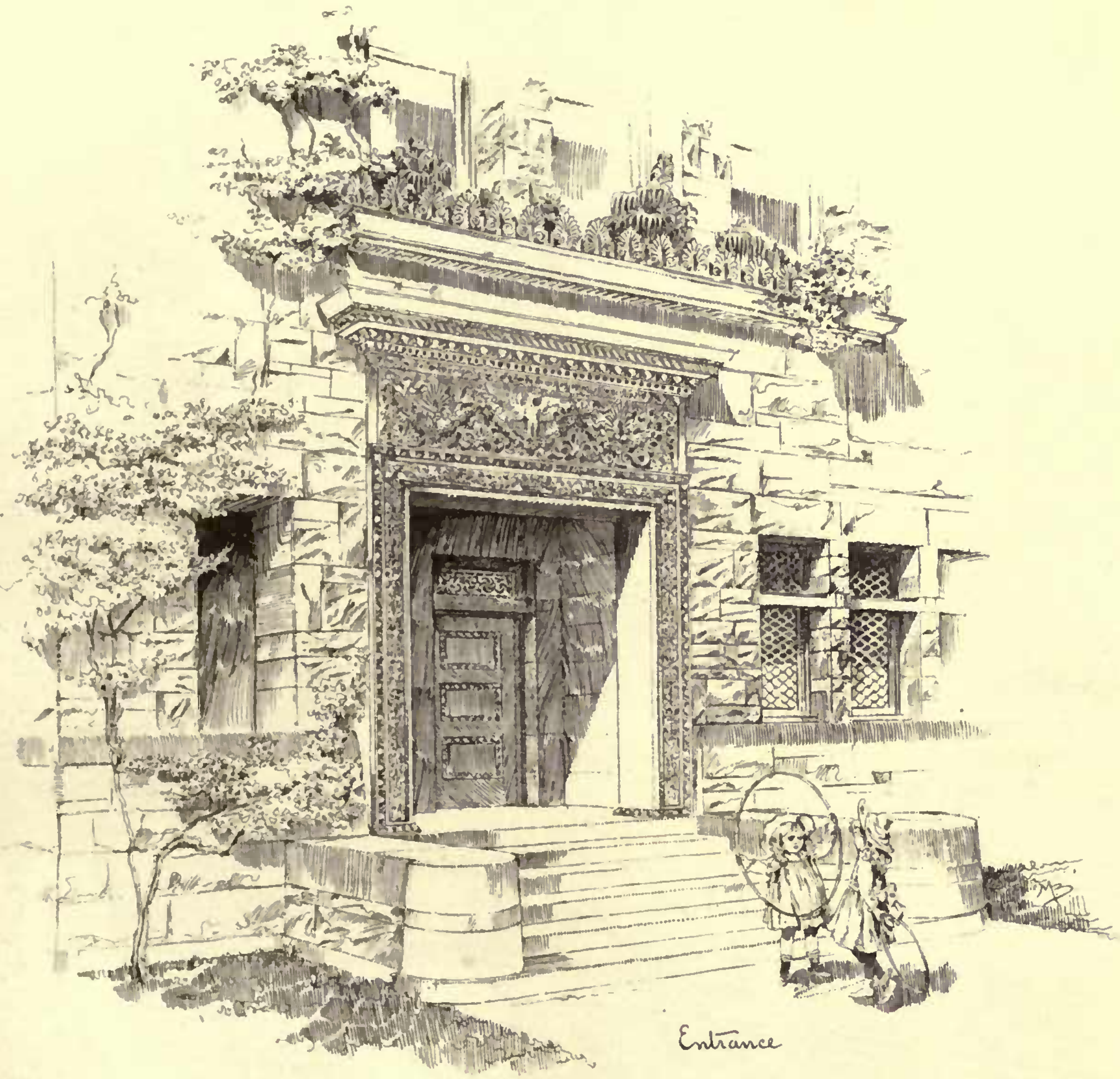
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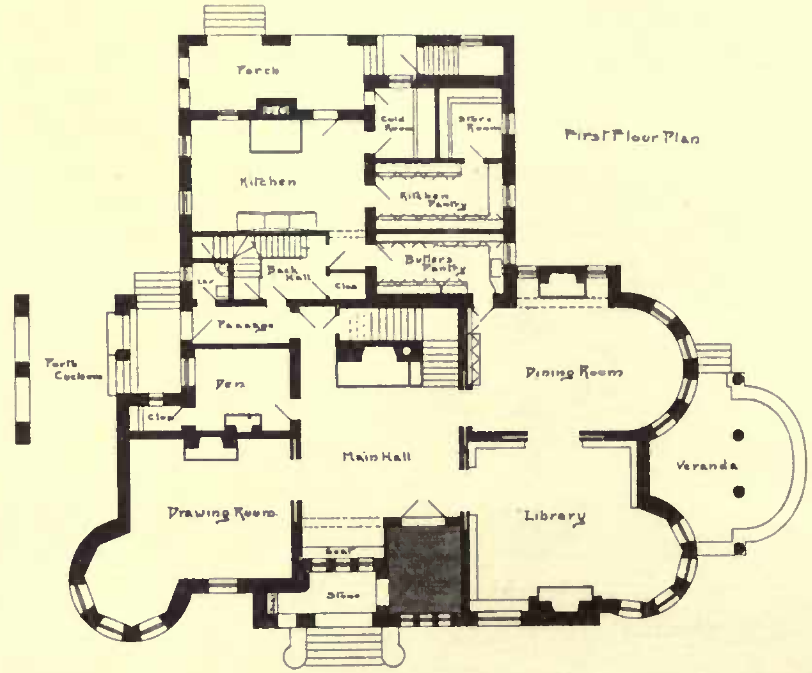
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Entrance

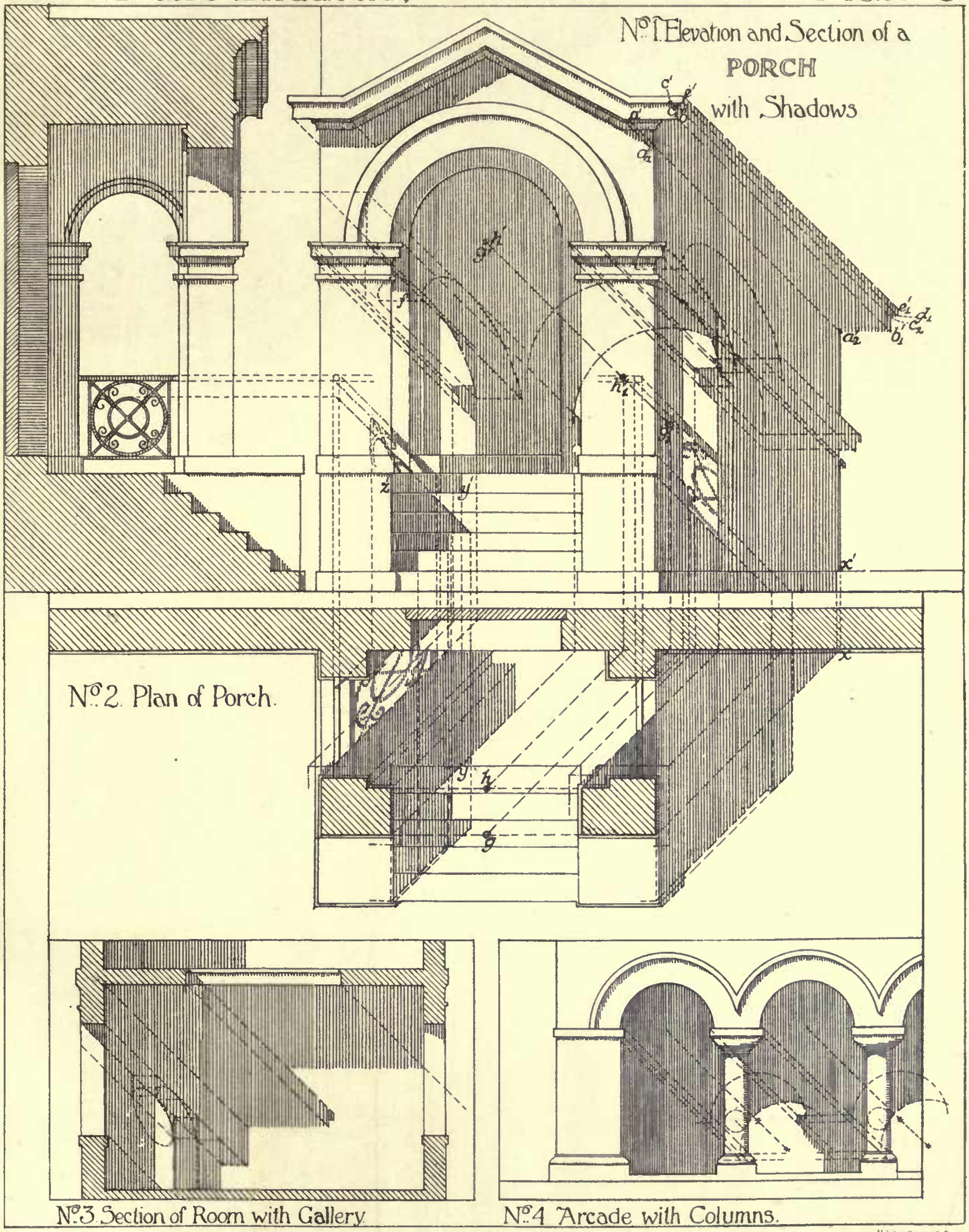


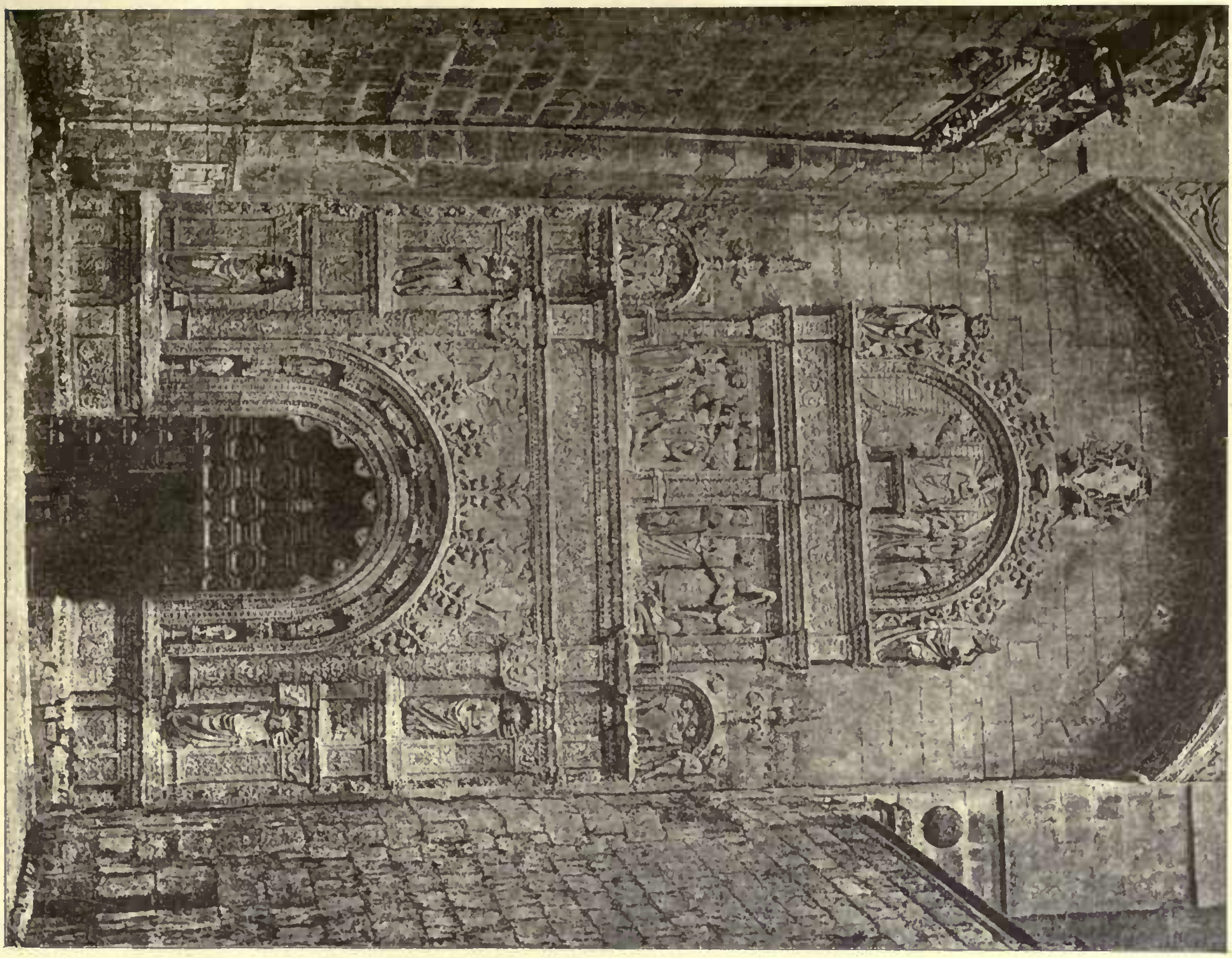
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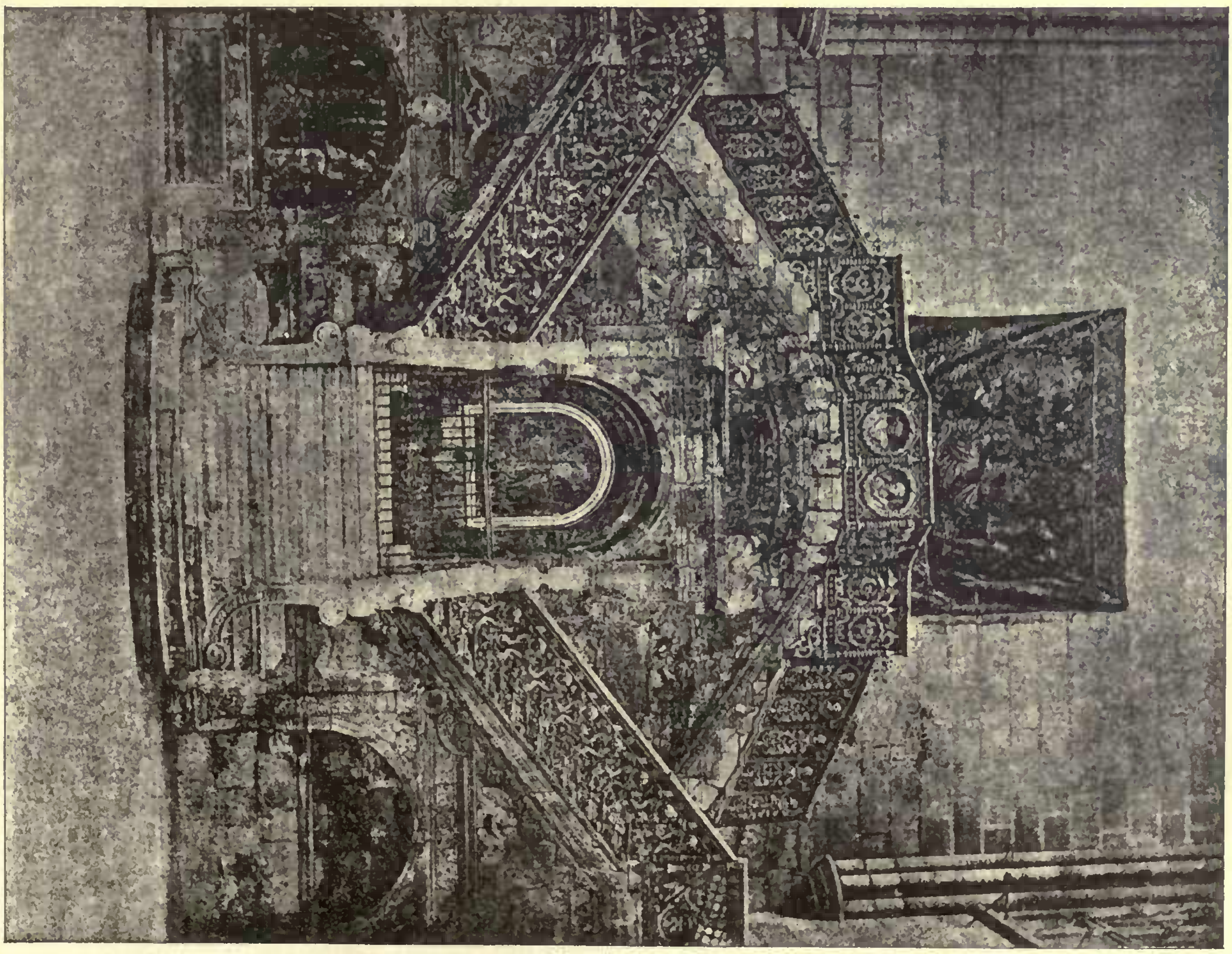
Green & Wicks Archts
Buffalo N.Y.

Shades and Shadows. Plate 3



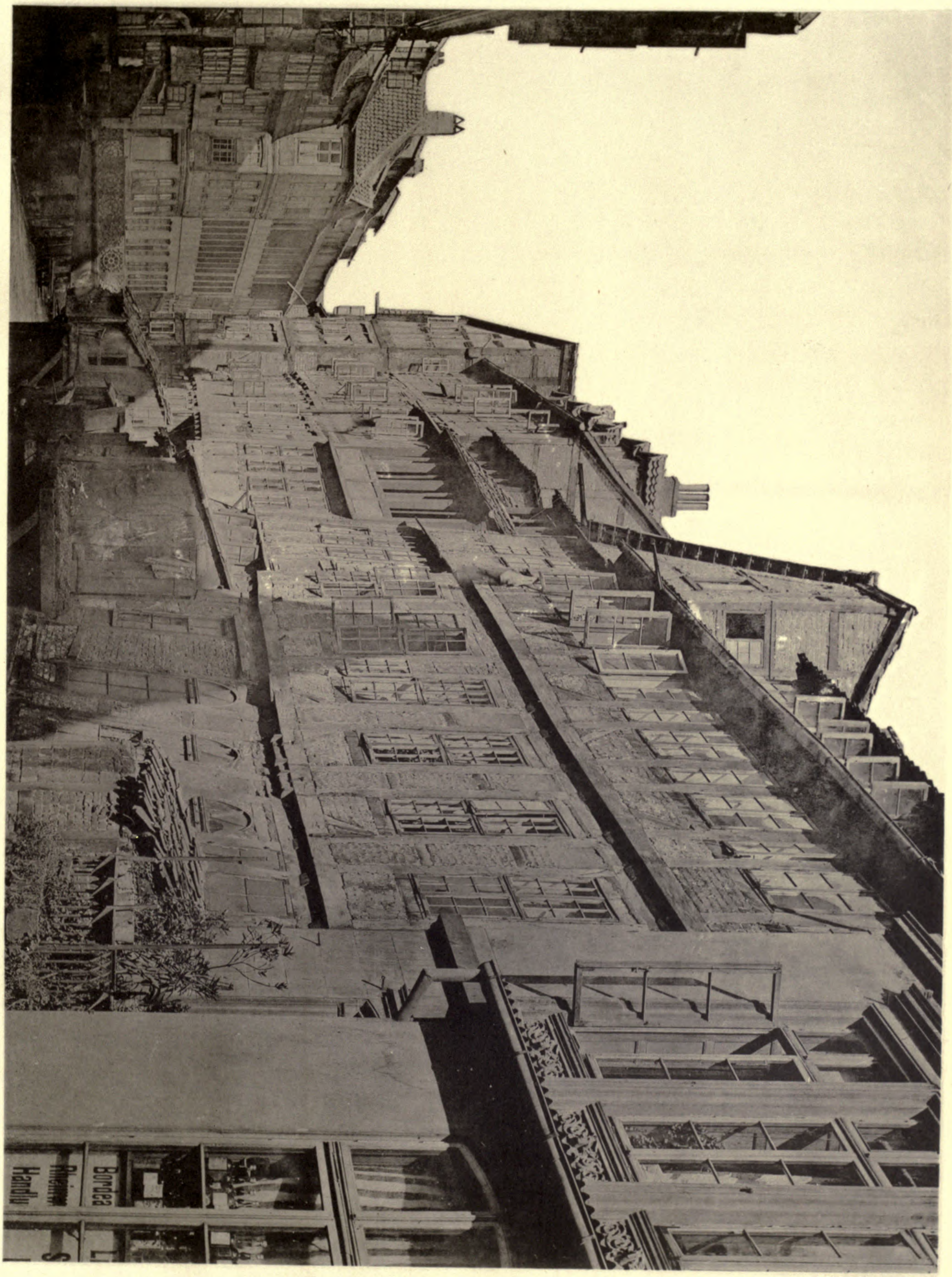


• Plateresque Doorway • Burgos Cathedral •



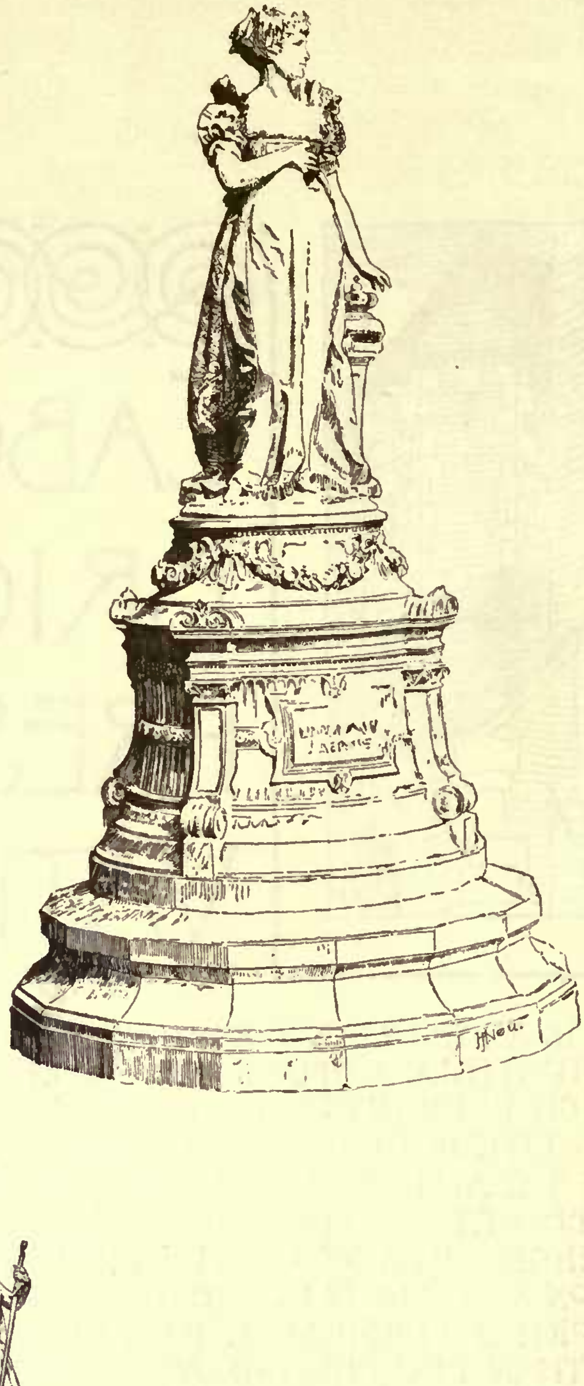
• A Stairway • Burgos Cathedral •

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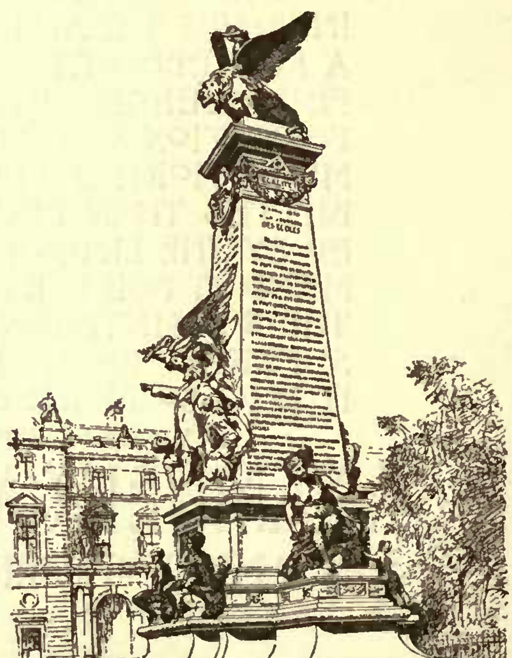


AN OLD GERMAN STREET.

HELIOTYPE PRINTING CO., BOSTON.







LE MONUMENT DE GAMBETTA, PLACE DU CARROUSEL, d'après de Tournaire.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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TRADE SURVEYS. 164

MR. JOHN C. MEAD, a very well-known architect and builder of Hartford, Conn., died there last week. Although Mr. Mead was primarily a builder, and executed a large number of important contracts, he was, like so many of the race of New England builders, a good deal of an architect also, liking to design for himself the buildings which he erected, and employing clever and well-trained draughtsmen to help give his work the character which he desired to see in it. Like so many, also, of the New England contractors, he was thoroughly honest and reliable, doing in the best way whatever he undertook, and endeavoring to justify the confidence which was placed in him, and he will be greatly regretted by those whose regard he had earned during his long residence in the State.

THE Joint Convention of the American Institute of Architects and the Western Association of Architects is to be held in Cincinnati, on Wednesday, November 20, at 10 A. M. According to the programme "the Annual Reports to and of each organization will be read, and the Constitution and By-laws, recommended to the reorganized Institute by the Joint Committee on Consolidation, will be submitted for the final action necessary to consummate unification"; and this will be followed by the reading and discussion of professional papers. In the intervals of business, visits will be made to the more interesting buildings of the city, and an exhibition of Architectural drawings will be held. As the notice is only preliminary, it may be that more satisfactory particulars will be given later, but to the ordinary mind it seems that the space given to the main business of the meeting, the most important business that has ever come before any professional body, is a very small one. Every one who has attended such conventions knows how long and tedious the chapter and committee reports are, and we are apparently expected to listen to a double dose of them on this occasion. Judging from past experience of one of the two great bodies, the reading of the reports addressed to its convention alone occupies a large portion of the working part of a day, and if this is to be multiplied by two, there will hardly be time enough left to do more than pass a vote, accepting the Constitution proposed by the Consolidation Committee, without change, or even discussion.

HOWEVER commendable such docility on the part of the Convention might be, it is much to be hoped that it is not to be brought by force to the display of so much virtue. The policy of the consolidated Institute, one of the largest bodies of professional men in the world, will affect, perhaps vitally, the prosperity and happiness of every member of it for many years, and the freest opportunity should be given for consideration of the all-important matter of a proper start. There have been plenty of indications, before now, that the members of the old Institute had little taste for the policy of presenting them, at their conventions, with official measures, which they were expected to ratify without question, and we do not believe that the new Institute will be any more tractable than the old one. The real purpose of the next Convention is not to hear perfunctory reports, or to listen to papers on the relation of the Beautiful to the Mathematical, but to make a fresh start, with the help of all the light that the united experience of a large number of architects can throw on the subject, in the task of making the practice of architecture more honorable, more satisfactory and more profitable, to those who exercise that profession, than it is now. The old Institute did not accomplish wonders in that direction, although it did something. The Western Association attempted admirable things, and made good progress toward success, but its position, as representing a section, made its energy less effective than it would have been in a united body; and if the reorganized Institute cannot be more efficient than either of the old ones, its life will be a short one.

ONE of the reasons why the Columbus Exhibition should be held in New York is said to be that arrangements have been made in the city to build an iron tower twelve hundred feet high out of iron pipe made in Ohio. Why it should not be just as easy to build a tower of Ohio materials in Chicago as in New York does not appear, and it would probably be quite as easy to raise the money for it in the West as in New York. However that may be, the plans for the structure are said to have been prepared by the superintendent of the iron tube-works at Findlay, Ohio, and to be now under examination by experts. The most singular thing about the whole affair is its enormous cost. The Eiffel tower, if we recollect rightly, cost, complete, about three hundred and fifty thousand dollars, while the steam-pipe affair, only one-fifth higher, is expected to cost two millions. Even the immense difference in the cost of iron in the two countries will not explain this disproportion, and one is forced to the conclusion that the Ohio plan has either been studied without very close attention to economy, or that steam-pipes are costly materials for such a structure. There would be a good deal of interest in a tower on the high ridge in the middle of the city, where it is proposed to erect the exhibition buildings, if they are erected in New York at all. A tower fifteen hundred feet high, after the Eiffel model, would not be beyond the capacity of our engineers, and from such a tower one could probably see into four States, and look directly down upon a population nearly equal to that of London.

MAJOR POWELL'S great scheme for reclaiming, by irrigation, a vast tract of land in the United States, now unproductive, seems to be making progress. Surveys are going on quietly, and a Congressional Committee has been over the ground gathering information, which will form the basis of a report to the next Congress. Speaking roughly, Major Powell expects to render about a hundred million acres of land productive which now produce nothing, on account of the summer droughts, which render what is naturally a soft, rich loam almost totally barren. As compared with the two thousand million acres of land included within the territory of the United States, a hundred million seems hardly worth going to much trouble about; but we must remember that seven-eighths of our country is still unimproved, and most of it almost incapable of improvement, and that the addition of a hundred million acres of regularly-irrigated farming land would increase by at least one-half the agricultural resources of the republic. Major Powell includes in his plan a scheme for draining Chicago southward, which affords some interesting thoughts in connection with an irrigation project. It becomes more evident every year that the fortunate days of agriculture in this country are nearly over. A hundred and fifty years ago, the virgin fields of Ohio and Western New York produced forty bushels of wheat to the acre, with little cultivation, to the great astonishment of the English farmers. Now, the same fields are nearly barren, and even with the fresh soil of Nebraska and Dakota, the average yield of wheat in the United States is barely twelve

bushels to the acre, while the average yield to the acre on English farms is thirty-six bushels. Of course, the secret of the comparative poverty of American soils is want of feeding, and, as experience at the South has shown, the necessary feeding, with our sparse population, is so costly that it is cheaper to take up a virgin tract in Dakota or Manitoba than to apply fertilizers to the soil at home in Ohio or Virginia. Just now, the edge of the comparatively exhausted district is approaching pretty close to the Mississippi valley. If Major Powell can invent a scheme by which the Chicago sewage, containing, as is calculated, more than a million dollars' worth of fertilizers a year, can be applied successfully and cheaply to restoring the prosperity of Iowa and Missouri, he will deserve well of his fellow-citizens.

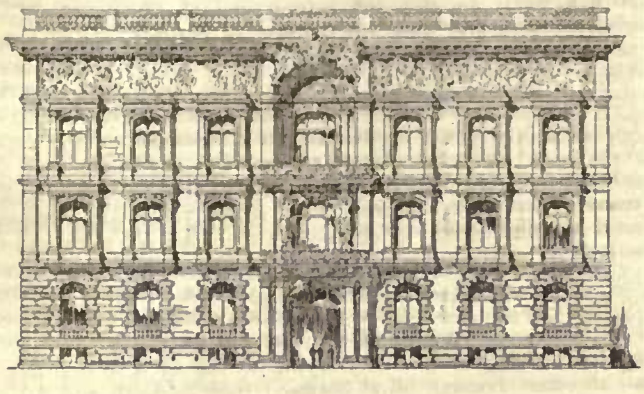
A RATHER sad story is told by Mr. Valentine, a Vermont official, about the desertion of that beautiful State by its former inhabitants. Standing with other officials on a hill in Bennington County, and looking over the valley of the West River, a tributary of the Connecticut, they counted fifteen contiguous farms, of perhaps a hundred acres each, all fenced, and with dwelling-houses and barns in at least tolerable condition, without a single inhabitant. Beyond, toward the Connecticut, but hidden by the maple groves in the valley, were, as they knew, fifteen more, also deserted, yet all well situated and still showing signs of their former fertility. Statistics show that a similar condition prevails all over the State. In Windham County alone are more than forty thousand acres of land, once cultivated, but now deserted, and in the whole State the number of abandoned farms, complete with houses, fences, barns and outbuildings, must be several thousand. Yet Vermont is one of the pleasantest, healthiest, most fertile and most civilized States in the Union. In its river valleys is no malaria, while its hills are covered to the summit with vegetation. The reckless agriculture which has made portions of the South nearly barren has never been favored in Vermont, where a century or more of stock-farming has rather enriched than exhausted the soil; yet the people who once found happy homes there have crowded into the towns, or have left the State altogether. In thirty years, from 1850 to 1880, the increase of population in Vermont was five per cent, while the population of the whole country more than doubled, and that of the adjoining State of Massachusetts increased by nearly eighty per cent. Not pretending to any ideas on political economy, we will not try to account for this strange condition of things, but it is certainly curious that a region so favored in climate and position should be retrograding so rapidly.

THE establishment of a little Venetian glass-blowing shop among the Exposition buildings in Paris has given occasion for some curious reminiscences in regard to this ancient Venetian industry. It seems that the glass-blowers of Venice, or rather, of Murano, a little island half a mile from the city, established themselves on the island about a thousand years ago, in order to avail themselves of the fine, white quartz sand, which they found on the beach, and at the bottom of the lagoon. During the earlier years of the business, the Murano glass-blowers made only simple household objects, but, as usually happens, artists appeared, one by one, among the humble workmen, and through their taste and skill the Murano ware began to be beautiful as well as useful, and to acquire a reputation in the world outside. At the time of the Conquest of England, Murano glass was an important article of export from Venice, and the choicest pieces were sold at high prices to kings and princes. In 1223, the Senate of Venice ordered that the names of the glass-blowers should be inscribed in the archives of the Republic, and the Venetian nobles were happy to give their daughters in marriage to the Murano workmen, whose children took the rank of their mother. For five hundred years the business prospered, but at the end of the sixteenth century it began to decay, like the other industries of Venice, and not only the artistic traditions, but the chemical and mechanical secrets of the art were lost.

IT was not until 1856 that a rich lawyer, the celebrated Dr. Salviati, undertook to revive the manufacture of articles of which he was already an enthusiastic amateur. A few glass-blowers still practised their art in a clumsy way at Murano, and Dr. Salviati, in the intervals of his law business, examined and compared his own and other ancient specimens of glass, to see how they were made, hunted up old books and manuscripts for information, and made ready for the time when, closing permanently his law-office, he associated himself with a workman, descended from an old Murano family of glass-blowers, and took up the art in earnest. It is hardly necessary to say how completely successful his efforts were. Until his death, which occurred last year, the business flourished more and more, and the name of Dr. Salviati & Company was nearly as well-known in London and Paris as in Venice, not only for glass-work, but for work in mosaic and other peculiarly Venetian arts. Under his skilful direction many of the ancient secrets were rediscovered, and even connoisseurs find it hard to choose between the old work and the new. At present, the glass-workers form a well-trained and highly-paid body, who labor in perfect harmony for the common good. Unfortunately, the work, which involves much looking into the mouth of the furnaces in which the glass is melted and reheated, is very trying to the eyes, so that nearly all the men become blind between their fortieth and fiftieth year. Everything that could be thought of has been done to prevent this calamity, but so far without success, and the workmen are obliged to content themselves with the reflection that, as their habits are simple, and their wages high, they can almost always save enough money, while their sight remains to them, to keep them in comfort afterwards for the rest of their lives.

SIR EDWARD WATKIN, the principal advocate of the Channel Tunnel, has a new scheme, which will not commend itself much better than the old one to his conservative countrymen. If the Government will sanction the completion of the tunnel, he proposes to do what he can to promote the building of a direct railway from England to India. Of course, the beginning of the railway will be at the English end of his tunnel. Passing through to France, it is intended to go southwesterly to Gibraltar, where the trains are to be taken across to Africa on a huge ferry-boat. On the African side, the line is to follow the coast through Morocco, Algeria, Tunis and Tripoli to Egypt, and thence across Arabia to the Persian Gulf. After crossing this, in some way which is not explained, the road will follow along the coast of Persia to Kurrachee, where it will connect with the existing system of Indian railways. This road, if by any possibility it could ever be built, would be about the most useless railway ever constructed. To say nothing of the fact that passengers from England, instead of making a long *détour* through Spain and along the intolerably hot, barbarous and unhealthy north coast of Africa, and the equally hot and still more barbarous Arabian desert, could take almost a bee-line to Persia, over the splendid Russian railway, traversing a cool, fertile and highly-civilized country, the Mussulman fanatics would destroy the Watkin tracks as fast as they were laid. The Russian railway, in the small portion which lies in a region exposed to marauding tribes, is guarded by garrisons in all the stations, which are fortified for the purpose, while nearly the whole extent of Sir Edward Watkin's line would lie in a region mostly held by independent nations, who unanimously regard railways as a device of Satan, and the Englishmen who build them as the favorite servants of the same potentate, whom it is the duty of the faithful to exterminate from the earth by the quickest and most effectual means. It will be remembered that the building of our Pacific railways was several times seriously interfered with by the Indians, and the efforts of a handful of red savages would be of little account in comparison with the destruction which would be wrought in a few moments by the well-drilled armies of the Sultan of Morocco or the tribes of Arabian fanatics. If Sir Edward Watkin is really anxious to have his tunnel project carried out, we will suggest to him to devote his energies to the construction of balloons. Perhaps he and Dr. de Bausset might together arrive at a successful result, and he may be quite sure that from the moment that an air-ship carrying fifty tons of freight or passengers sails with precision to a point a hundred miles from its starting place, the fear of standing armies will cease to enter into the calculations of statesmen, for the reason that ten men, in a balloon capable of being navigated, could work more destruction in a week than an army of a million men could in a year, and that, as no fortifications would avail against a balloon, all nations would be held to peace and concord by the certainty of extermination if they gave cause for offence.

BERLIN DWELLING-HOUSES.



House of Herr Mosse: the Front.

THE average German house is finer-looking and more solidly built than either the average English or the average American dwelling. Timber is unknown as a building material except in the villages of the mountainous districts; and the coarse brick so common in England is reserved for barns, stables and out-houses. Dwelling-houses receive an outward application of mortar, composed of fine sand and lime or cement, whose light color bestows a more cheerful aspect than the dun of brick under a sky which, like that of England, is prevailingly dull and overcast. A greater profusion, too, of ornament is to be observed: the new, as well as the ancient houses, even of poor country towns, often possessing balconies, pilasters and cornices of elaborate designs.

The whole weight of precedence here is in the direction of durability in building. The German builds for renting as well as for living, and has an eye, in consequence, to a future minimum of repair. His money is spent exclusively on the skeleton of the building, the finishing and furnishing of the interior being held to be of very little weight. Often he lives contentedly in the basement or ground-floor of his house, considering the suites of upper rooms as a speculation, not as a portion of his home; and as for the extra ornament of a balcony on the first floor, its value lies, for him, in the attraction which it gives his house over the plain fronts of his neighbors. The wealthy burger who does not let apartments, on the other hand, houses his business under the same roof with himself.

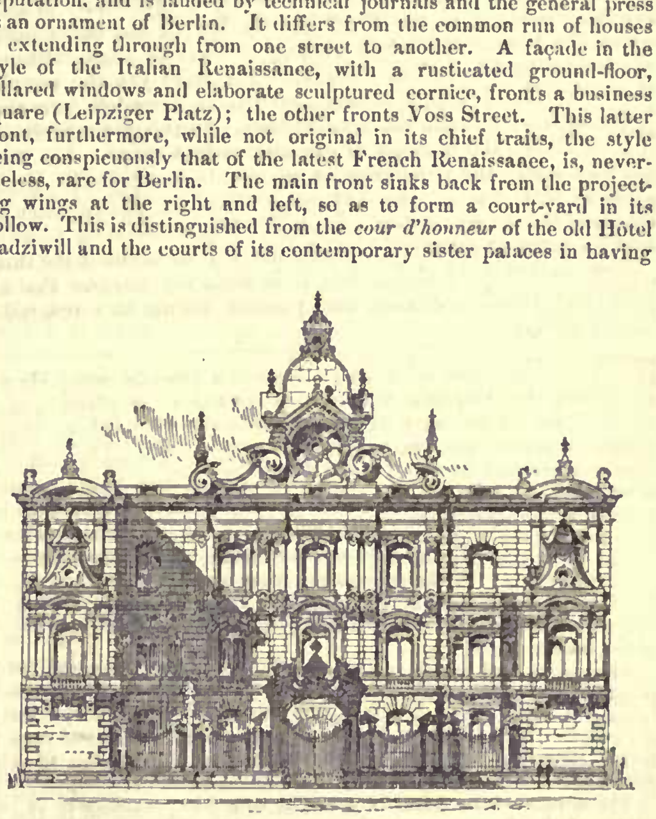
The instances are rare, therefore, where Berlin dwellings are units, or embodiments of a single purpose. Division of labor, so to speak, is not the rule in their case; or, rather, the final stroke of division does not obtain. The church has been lopped off from the home, except in the palace of the king and the obscure cottage of the mountaineer — those two strongholds of conservatism — inasmuch as what it embodies is a sentiment of a common religious fraternity under God. So, too, the school, the bank, the station: the horse-block, once the symbol of travel attached to every house, is transformed into the platforms of great railway depots; the peasant's "strong chamber" and chest into the public safe; the oak bench into the public grammar school. The manor-house, indeed, has a door still inscribed "The Justice Room"; but the example is exceptional, and is drawn, moreover, from the provinces alone. In the city, the resort of great hordes of population, civic and communal interests of every kind have each its own abiding-place, except one — trade is not loosened in Germany from the home. As the peasant, in contrast to the American farmer, keeps his cattle under the same roof with himself, so the German tradesman of the town retains, in contrast with the American, his wares in the same house with his family. He is indifferent to whether his business occasions a rare or a perpetual influx and outflux of the public, a little or considerable inconvenience, the loss of a minimum or a maximum quantity of room. He remains attached to the old patrician custom, and the patriotic literature of his country praises his conservatism.[1]

A successful domestic architecture is excluded under these circumstances; or, if not excluded — since the gentry and aristocracy, with their different traditions, are builders likewise — it is, at least, restricted in the direction of manifoldness more than is necessary. And, indeed, we find that a Berlin home is not a unit of entrance-halls, family-rooms, chambers and society-rooms, but a duplicate of these; or that the one roof and four walls enclose both families and a workshop, which is still worse. The number of styles of domestic architecture are few, and singleness of design, which is the first essential of successful architecture, becomes in the latter case mentioned, where a home and trading-house are combined, quite out of question. A building of this class must express but the half of its purpose, or the contrary purposes of privacy and the troublous publicity of business. Structures result that are stores or factories in form, with the use of family residence which they likewise serve left without due expression; or they wear the symbols of family sentiment or origin outside of interiors that are actually filled with bales and boxes.

Lübke calls attention, in his "*History of Architecture*," to the villas of Berlin as distinguishing the North German capital from Vienna, and as being among the finest productions of recent architecture. Naturally, the reform of separating trade from the home, that gradually must spread itself everywhere, has won more ground in the western German metropolis than in the eastern one, just as we find more families occupying houses by themselves on the Rhine than on the Danube. The villas which Lübke praises are residences of rich noblemen or of millionaires who cultivate with enlightenment the modern tendency towards independence and individuality. For the most part, they are edifices of ample dimensions on sites favorable to the laying-out of a harmonious garden-plan. They are constructed of light gray or yellowish sandstone in the architectural contours, and of brick covered with mortar in the filling-up walls. In the best examples, the flat surfaces also are of stone. The style of nearly all is Renaissance, or inspired by the Renaissance. Such are the main traits of the residences of Herr von Thiele-Winckler, Baron Barsig, Herr von Bleichroder, Herr Gerson, Herr Mendelssohn and Herr Sussmann. The Fridenthal house adds colored majolica to the sandstone and stucco. The Pringsheim Palace, which was endlessly commented upon by the public, brought to the exterior the polychrome aspect of the interior of old Fäger Street houses. The Soltman House, another landmark of the capital, breaks from the prevailing Renaissance, its style being Greek.

In the twenty years since Lübke's book was written, the increase of population, that goes on at the rate of forty thousand souls a year, has forced a condensation in building. The quarter lying towards Charlottenburg, which he mentions, has few duplicates in the newer portions. The demand for one-family villas is tolerably supplied, and any considerable addition to their number is likely to proceed only with a growing revolution in the conservative habits of the citizen class. For the present, at least, so far as my observation goes, the task laid upon architects is the old one of making plans for buildings that are crushed in between others, and of uniting the two purposes of residence and trade.

Of this type is the mansion of Herr Rudolph Mosse, just completed. The plan is by Messrs. Ebe & Benda, two architects of high local reputation, and is lauded by technical journals and the general press as an ornament of Berlin. It differs from the common run of houses in extending through from one street to another. A façade in the style of the Italian Renaissance, with a rusticated ground-floor, pillared windows and elaborate sculptured cornice, fronts a business square (Leipziger Platz); the other fronts Voss Street. This latter front, furthermore, while not original in its chief traits, the style being conspicuously that of the latest French Renaissance, is, nevertheless, rare for Berlin. The main front sinks back from the projecting wings at the right and left, so as to form a court-yard in its hollow. This is distinguished from the *cour d'honneur* of the old Hôtel Radziwill and the courts of its contemporary sister palaces in having



House of Herr Mosse: the Rear.

trees and gay parterres, besides wagon-ways, in place of the plain stretch of cobble-stone pavement, which was meant to resist the stamping of disorderly cavalcades. What charms is the harmonious development of architectural traits of the main façade into heightening effects from below upwards; as in the case of the *rustica* of the foundation, that is modified, first, to flatness of surfaces, is diffused as pillar-like divisions in the second story in support of the fluted pilasters of the third, to reappear in the terminating obelisks of the roof in its last modification as a horizontal line of ornament. Then the concentration of richness of ornament in the central portion of the front, as is seen in the pairs of pilasters at the immediate right and left of the central windows; whereas the next have but a single pilaster, and the more distant ones near the wings are devoid of any. This, too, must be regarded as a trait of artistic beauty. Owing to it, the gable-like cupola that surmounts the middle portion of this façade pleases the eye, despite of its heterodoxy. Then the projecting wings are but two stories in height, and the circumstance adds

[1] *Vid* Gustav Freytag in "*Soll und Haben.*" Fontane: Wilibald Alexis and Fredrich Spielhagen.

to the pyramidal aspect of the building—an aspect that in other respects is reserved in spite of its richness, and monumental notwithstanding its picturesqueness.

Whereas the exterior thus varies in several points from the usual Berlin house, the interior construction is highly typical. The ground-floor is given up to the business offices of the owner, who is a journalist; the upper, or third floor, to a tenant, the Ambassador of the Sublime Porte.

A paved passage-way pierces the main edifice from the square on the south front to the court-yard in the rear. In the wall at one hand a stairway pierces the building, in its turn, from below upwards to the dome of the roof. The stairway is spacious and well-lighted; as, indeed, one of the chief revolutions in house-building in recent years in Berlin has been the replacing of dark stairways with lighted ones. The walls are simple. The architectural decorations are of stucco of light hue, and columns or pilasters of violet-colored marble. The steps are of oak with a carved balustrade. They lead from the bureaux below to the two lodging stories above, both of which are similarly arranged. A hall leads into a bedroom at one hand, and at the other into ante-rooms. These latter conduct from one end into a corridor that branches into a passage in the western wing. In the angle of the two lie the kitchen and back stairways at the termination of the branch passage-way are the conservatories or winter gardens.

The dining-room, sitting-room, gentlemen's *salon*, *boudoir* and dancing-hall occupy the front, with a southern exposure. The library, the Gobelin-cabinet, billiard-room, picture-gallery and smoking-room fill the eastern wing, and are lighted from the court: except in the case of the cabinet, which, being in an angle, is lighted from a slit or light-shaft from above.

The style of decoration of both suites of apartments corresponds in general with the style of the exterior architecture: the rooms on Leipsic Square leaning towards Italian Renaissance; those on the court, to the French Renaissance and Baroque styles. The latter are still in the hands of painters and sculptors, but the intention of the architects is everywhere apparent. The picture-gallery near the extreme end has walls of sandstone precisely like the exterior walls. The pavilion is painted *al fresco.* The library, which begins to possess a comfortable air, has a gallery and closable wooden book-cases, with ceilings of wood. An increasing richness of decoration makes itself noticeable in the billiard-room, and the adjoining *salon* and Gobelin-cabinet. The wall-divisions, panelling and ceiling of the latter are of richly carved wood, the ornamentations in relief, being painted in gay and various colors. The *salon* has long walls painted in imitation of terra-cotta slabs: one of the gable walls, of glass, looks upon the court; the other, of mirrors, connects rather than divides the apartment and the dancing-hall, in the exterior southeastern angle of the house.

The opposite western angle is occupied first by the dining-hall. This is an apartment that strikes a Berliner by its size. The old German *saal* unites the functions of eating and dancing, and, when this double office became impracticable, by the demands of a sharp difference between the furniture of a room meant for conversation, and of one meant for supplying hunger quickly (the court set an example under the late Emperor William I of incredibly rapid serving), and as a *salon* with its sofas was the most indispensable, Berliners transferred their sideboards into some inferior room. The number of houses were few that could seat forty at once at table; but, in spite of the custom of serving *à la buffet*, sitting at table always remained the secret ideal of the aristocracy used as they were to the amplitude of their country *burgs*. With a reform of stairways, therefore, there began a widening of the dimensions of the dining-room. In the present case they attain a size capable, as I judge, of seating from sixty to eighty; or a length (although not quite the breadth) of the dancing-hall, or the largest apartment of the house.

The ceiling and panelling of the room are of oak, decorated with painted marquetry designs. A mantel of harmoniously-toned faience in one corner conceals the warm-water apparatus for heating; while the window, the gable and the back wall have each a buffet constructed as an organic portion and outgrowth of the panelling.

There follow from here in a single suite that terminates in the dancing-hall, like the rooms of the eastern wing, the three standard pieces of every genuine German home: the sitting-room, the *Haus herr's salon* and the *Haus frau's salon.* A library, billiard-room and dancing-hall are the signs of wealth and luxury; the terms "reception-room" and "*boudoir*" are exotics; *this* trio of rooms, in addition to the bedroom and eating-room which the lower classes have also, is the symbol of respectability, and, in Berlin as everywhere, they are the centre of family-life; of the three rooms that of the *Haus vater* being perhaps the most often used, as it is the most richly and comfortably furnished.

In the present instance, the sitting-room has a ceiling of stucco, doors, low panelling and frieze of ebony-toned wood, painted with marquetry designs of pale yellow. The gentlemen's *salon* is decorated in walnut wood; the panelling being high and giving the *nuance* of style for the book-cases that are carved out of the same wood. Both this ceiling and frieze, and the ceiling of the adjoining room are of stucco: the latter being perhaps somewhat too elaborate in design. The furnishings of the room, it must be remarked, are of rose and silver tones on a ground of sea-green. The air of half-affected, half-healthy, high-bred daintiness which they give the apartment becomes, however, common and almost mere restaurant-like worldliness through the introduction of exuberant bodies modelled in stucco overhead.

An exquisite *boudoir* in a house not far distant from this of Herr Mosse's, that of General von V. R., is spoiled by the same adherence to "genuineness" of style. The Renaissance, with all which it supplies for expressing our social tendencies, was lacking in both our modern idea of a wife, and in the architectural embodiment of the idea. An expression is to be found in one or the other modification of old styles for everything perhaps easier than for the typical modern wife, especially for the German wife, and the architect if anywhere must here call upon his own artistic and creative instinct.

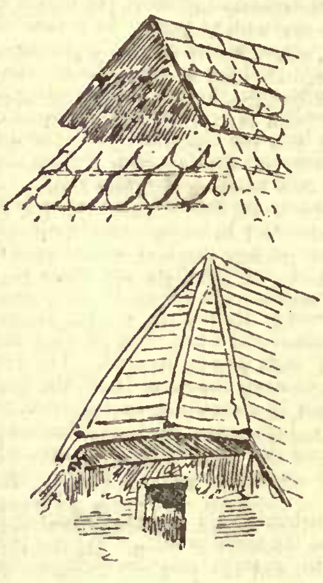
The dancing-hall, lastly, conveys an air of rich refinement that is not without its appropriate kind of light sensuousness. The clear transparence and simplicity of amber and white and gold, that are the base and original tones of coloring, give way, for the most part, to yellowish composition marble in the columns and yellowish stucco in the other architectural parts, relieved only by the gilded complicated ornamentation of the walls. Paintings fill the fields between the gold frame-work of the ceiling. The marble groups of sculpture are toned; the divans, of scabious-colored brocade. The grand square piano in the middle of the room, and the faience mantle in a niche at one end, alone are of white and gold; they lend the points of high light to an apartment that is the climax, and was meant by the architects to be the climax, of taste and richness.

The doors throughout the two main suites of rooms described are sliding. But the old form of hinged-window is retained, in spite of the inconvenience caused in opening the casements which catch in the curtains, and of the fact that the handles are generally too high for easy reach.

There is less marble employed than is the case in older houses. Nor is the marquetry genuine inlaid-work. It is characteristic of present tendencies, perhaps, that stucco should be preferred with its looser more lustreless surface, and in consequence warmer air, to the colder polish of marble. As for marquetry, it is, as I had the opportunity to see at the German National Industrial Exposition last year, an art that is hardly yet revived. Germans for the present satisfy themselves with intarsial painting.

COUNTESS VON KROCKOW.

THE PROBLEMS OF CONCENTRATED RESIDENCE.[1]



WHEN we speak of concentrated residence, we naturally think chiefly of the principal form of such concentration, large cities; and, in our own country, of its most crowded city, New York; and, in New York, of its most prevalent form of concentrated residence, its tenement-houses. And we generally think next of New York tenement-house evils.

The New York tenement-house evils most generally complained of may be stated to be:

1. Overcrowding.
2. Dirt (including contaminations from neglected or bad drainage, etc.).
3. Lack of command of air and light.
4. Promiscuity or lack of privacy.
5. Injury to health, or morals or manners, resulting from the presence of any of the foregoing named evils.

In New York, as elsewhere, the problem which concentrated residence presents us is to find a way of eliminating evils, while yet retaining a high rate of concentration, and so retaining the convenience of residing close to the centre of our chief interests, whether of work or recreation, and the further convenience or economy of combining and coöperating with our neighbors to more easily and cheaply supply our needs or wants, physical or social.

While, then, not losing sight of this convenience of living close to the centre of our interests, and noting that a similar wish on the part of our neighbors must infallibly lead, if acted on, to a very high rate of concentration at the points where such interests most centre, let us consider the evils which we have just named as among those which such concentration of residence has brought with it in this single instance of New York tenement-houses.

And first, we can easily understand and concede that where any one evil exists by itself, it is more easily dealt with than where combined with other evils, and resulting from them.

Thus the evils named fifth and last in our list, ill-health, or bad

[1] A paper by Mr. E. T. Potter, prepared for the late Congress of the American Social Science Association, but unread through lack of time.

morals, or manners, for instance, are not confined to overcrowded localities or tenements. Yet in overcrowded tenements, owing to the lack of privacy, the bad air, the overcrowding, it *is* more difficult to avoid them. And so the responsibility for them is partly divided. Though largely personal matters, yet they are not completely so where privacy, good air, cleanliness and space, are not fully at command.

So with the evil of lack of privacy. Though a lack of privacy is not confined to tenement-houses, but is rather the usual incident of daily life of many of us, and while, perhaps, few really care for much privacy, for very long, or really value it as much as they often profess, yet we all wish to have privacy at complete command at need. Yet a complete command of privacy is, in a tenement-house in New York at present, sometimes and in some respects, though not all respects, a difficult matter. And, in general, we may certainly concede that the greater the crowd, or, in other words, the higher the rate of concentration, the more difficult it is to secure privacy, except, indeed, by some form of a prison-cell-like seclusion.

The evil of lack of air and light is still less a personal matter. And, though more often a matter of personal indifference, or choice, or lack of care, than most men and women are willing to admit, yet the more closely built-up the locality, the more care and study has to be put forth to secure proper air and light, and then succeed in keeping them.

The evil of dirt, to be sure, is almost wholly a personal matter. There are many tenements whose neatness might put palaces to shame. Neatness, says the French proverb, is the luxury of the poor. And it is a luxury often to be found in most unexpected places, and maintained at a high rate, and with an infinity of care and labor. It is so little a matter of architecture, or plan or locality, that the most disgustingly filthy tenements we find have often been the houses of the rich; and sometimes, so little a time before that the building has had no time to get really "out of repair," but is only shockingly dirty. Still the more crowded a tenement-house is, if crowded with dirty people, or even if it has but one or two dirty people in its crowd of tenants, the more difficult it is not to have the whole house get dirty, or, at least, get a dirty aspect. And, further, the darker and more airless its interior, the more difficult it is, generally, to keep a house fresh and clean.

We note, then, that the evils of ill-health, bad morals or manners, lack of privacy, lack of air and light, and lack of cleanliness, though often present in tenement-houses, and combined with overcrowding, yet may be present in other places, and in places where overcrowding is wholly absent. Yet, still, that they are evils which it is more and more difficult to deal with and avoid and prevent, the higher the rate of concentration of residence, or, in other words, the greater the crowd and the crowding. I do not say "overcrowding." There can be, it seems to me, no overcrowding, so long as the evils of crowds are overcome and absent. But wherever the evils of crowding are present, there the evil of overcrowding is present, whether resulting from the presence of a crowd, as in great cities, or from ignorance or greed, as in badly-planned farm-houses and cottages, or from mere sloth and indifference, as often in wild camps and savage huts.

Thus the evils, the real evils, usually connected with overcrowding are also largely personal matters, possible to be met with in all countries, and in localities where there is no crowd, or no occasion for one. Still, in general, the evils of overcrowding are most to be looked for where the crowd is greatest. Even then, if the crowd is left to itself, its atoms quickly arrange themselves, so that the evils of overcrowding are largely avoided, while the value of concentration of residence is still in a very high degree secured. The freer the individual atom to avoid evil, to avoid harm to itself, the less is there likely to be at any one point of congestion, or too great concentration, even though a very high rate of concentration of residence is maintained, and is maintained over a widely extended area; as we see, for example, in our own country in the city of Philadelphia.

Whether less or greater the numbers in a crowd, and whether distributed over a less or greater area, the moment that, at any one point, the crowding breeds serious evils, even serious discomforts, there there is overcrowding.

Overcrowding can only be lessened, and its repetition avoided, it seems to me, in one of two ways. We must either lessen overcrowding by lessening the numbers constituting the crowd, or else, without lessening the crowd, we must wholly remove the evils which constitute overcrowding, and thus change *over*crowding, or a bad form (and, therefore, a too high rate) of concentration, into simply a good form of concentration; a form, namely, giving the benefits of concentration without attendant evils.

To diminish the crowd we have again two methods: one agreeable, one disagreeable. We can lessen the crowd at any one point by presenting greater attractions elsewhere. This is the agreeable method. Or we can lessen the crowd by force, by laws limiting the numbers to be housed in any given space, and carrying out the provisions of such laws, where necessary, by force. This is the disagreeable method. Yet when other methods fail, self-defense makes it necessary that we *should* limit the numbers housed in any given space to the just-possible of comfort necessary to health, and so to life; just as we must limit the numbers of those entering a life-boat to its life-saving capacity.

The limiting by law of the numbers permitted to be housed in a given space, the Board of Health of New York have wisely endeavored to make use of; but to do this in *addition* to careful removal of all possibly removable features injurious to health. And the death-rate in the chief tenement-house districts in New York is reported to be materially dimished by these means. But the health laws in the matter of limiting the numbers of occupants in a house are very difficult of enforcement. Violations in some quarters are reported as often unpreventable. Houseless people find housing somewhere, even if in houses already filled to their legal limit. Still as fast as needed additional housing is obtainable elsewhere, the possibility becomes greater to keep the numbers housed at any one point within the limit fixed by law, and to retain them thus within legal limits by force if necessary. I suppose there are occasions when, to do so, the employment of force will always be necessary. There are people whom, in this as in other matters, nothing but force will restrain.

But I have felt that this method is a disagreeable one, for not only is law, or the forcible imposing and carrying out of enactments a form, after all, of violence or war, but also necessarily like most forms of violence it is destructive rather than constructive. It does not help those in trouble; though it checks them from harming others. It does not help forward our race to greater comfort and more convenient living. It is cutting rather than unravelling the knotty problems of concentrated residence. It does not even cut them, except in a temporary sense. It merely, for the time, thrusts aside the question, and thus in a measure the hope, of a solution of such problems.

Turning from this sometimes necessary but disagreeable and difficult, and at best only temporarily effective, and so in the long run futile method of dealing with overcrowding, to the more agreeable method of lessening overcrowding and over-concentration of residence in any one spot, by offering and providing greater residental attractions elsewhere; and so drawing away the crowd from the most crowded parts of our cities, we find that this method is now receiving, throughout our country, a great impetus from the growing interests in coöperative-building associations, and a more widely-spread knowledge of their beneficient possibilities and worth. Through these and other associations, and through individual effort, the pleasant work of providing pleasant and healthy homes in countless pleasant or hoped-to-be-made-pleasant localities, is sure to go on; since the prospective rewards to the promotors, whether prospective inhabitants of those localities or others, are constantly seen to induce men to enter upon such an interesting and inspiring task.

But, however well this task goes on, still it does not answer, but rather leaves on one side and unsolved the question: What is the very highest rate of concentration of residence possible at any given point, consistent with health and comfort?

This problem, however, it seems to me, still presses, and will always press, for solution; for the highest rate of concentration of residence consistent with an absence of discomforts and perils to health will, in some localities, be temporarily or permanently always in demand, because it will be looked upon by so many as the filling of a great need, depending, as it does, on the advantage of nearness to some temporarily or permanently important and centralizing point.

It has seemed to me wise, therefore, to employ such leisure as I could command in studying this matter, and to do so in the interests of others, even when I saw no way to make it profitable to myself.

The possibility of a rearrangement of the component parts, or atoms, whether persons or inanimate material, in the most crowded localities, and the removal of all removable obstacles to such rearrangement and to individual seeking of the most healthful and comfortable conditions, consistent with a high rate of concentration of residence, has thus been my study for a number of years.

"Where a man sleeps there he resides, there is his legal residence," says the English law. Where, in a limited area, many have their residence, there there is a form of concentrated residence. We see in different places different forms of concentrated residence; each form has its merits and defects or drawbacks. These merits and defects are — some local, some general. Each form would be by far so much better for general use elsewhere without these drawbacks, any or all of them; and, in some localities, that form which combines the most of the merits of these differing forms, yet avoided their drawbacks, would have a certain advantage of desirability over them all. We can conceive of such a form of concentrated residence being slowly evolved out of men's experiences of these various merits and defects, and coming into widespread use through a general, though entirely unsystematized, recognition of the varied values of such a combination. Or, again, we can conceive of the various merits and defects of all these forms being examined into and collated and tabulated, and a systematized recognition of them being followed by an attempt to combine in a new form of concentrated residence certain merits peculiar to one and another of the previously existing forms, while at the same time avoiding in the new form their demerits.

It is such a system, such an artificially-arrived-at system, that I desire to call attention to.

In seeking to find a possible way in which one and another evil of New York tenement-houses might be avoided, I came to look for the cause of certain of those evils, which seemed to be almost peculiar to the tenement-houses of New York and its vicinity, in some feature peculiar to the locality where such evils were present, and absent in localities where such evils were generally absent. In this way, I

passed from the study of certain evils under one form of concentrated residence to a study of the general subject of the problems of concentrated residence.

In pursuing my studies on this subject, I have not, after many years, yet found an instance where those problems, so pressed for solution, as at the point where I began to study them; viz., in the tenement-houses in New York.

Thus, in the vast city of London, with a population far larger than that of New York, Brooklyn and Jersey City combined, though I find overcrowding often greatly complained of, yet nowhere do I find such a thing known as, for instance, the majority of the people of the working class sleeping in bedrooms with no direct air or light, as is the case in the majority of the tenement-houses of New York, Brooklyn and Jersey City. Again, further, and still more remarkable, I cannot find in Philadelphia, a city of over a million inhabitants, either any prevalence or scarcely a known instance of this evil of bedrooms without direct air and light; nor, indeed, do I find in Philadelphia any general complaint of overcrowding.

The fact that London, a city vastly larger than New York, Brooklyn and Jersey City combined, yet is wholly without an evil notoriously prevalent in and characteristic of New York, Brooklyn and Jersey City, destroying the comfort and injuring the health of perhaps a majority of their inhabitants, and adding to the death-rate, seems to me most significant. And still more significant is it, it seems to me, to find an evil absent in a city of the size of Philadelphia which is prevalent in cities, some larger and some smaller, so near to it as New York and Brooklyn and Jersey City. Such a fact seems to me to indicate that the cause of the presence of this particular evil must be looked for in the presence of some factor present in those cities in which the evil prevails, and absent in the city where this evil is markedly absent.

Philadelphia, like New York, is a city lying between two rivers, the opposite sides of these rivers being occupied by West Philadelphia and Camden, just as the opposite sides of the rivers on each side of New York are occupied by Brooklyn and Jersey City. West Philadelphia is connected with Philadelphia by bridges, just as Brooklyn is connected with New York by the Brooklyn Bridge. Camden is connected only by ferries, and lies in a different State from Philadelphia, just as Jersey City is connected with New York only by ferries, and lies in a different State from New York. These subordinate cities have behind them unoccupied area, giving opportunity for indefinite extension in the one case as in the other; and the main cities lying between them, while bounded on the east and west by the rivers, between which they lie, can both extend indefinitely in length: Philadelphia on both north and south, and New York on the north. If we contend that here is a difference — that New York can extend only on the north, while Philadelphia can extend on both north and south — that difference can scarcely be made to account for the absence of evils in Philadelphia which are present in Brooklyn and Jersey City, cities which can extend indefinitely not only on two, but on three sides.

If we look closer at good maps of all these cities, however, we see a marked difference. The maps of Philadelphia, West Philadelphia and Camden show an infinity of small streets, at frequent but irregular intervals, crossing one another, generally at right angles, indeed, but otherwise governed apparently by no other rule than the wise one of the needs of the locality and its inhabitants. Further, on a map of sufficient size and fulness of detail, we note that these small streets give access to lots of all sizes, some of them exceedingly small indeed; while, on the other hand, the maps of the main areas of New York, Brooklyn and Jersey City show no such multiplicity and variety of streets, of various widths and lengths, to suit the varied needs of a community, but only one inflexible street and lot system — a system also rectangular, but allowing of or encouraging no subdivisions of large areas of land by small streets, and so *giving no means of access to* small lots such as prevail in Philadelphia, and on which stand the dwellings, the cheerful, wholesome dwellings of the majority of its inhabitants, every dwelling with direct air and light in every room, through-and-through draughts of air at command through most of the dwellings, separate entrances, entire privacy and individual ownership.

Becoming gradually and slowly convinced that in the absence of readily procurable small lots, to meet modest needs and limited purses, lay the cause of the absence in New York and Brooklyn and Jersey City of small houses owned by their occupants, as in Philadelphia, and lay the reasons why the place of such small houses, owned by their occupants, was in New York, Brooklyn and Jersey City taken by tenements, rented generally by the week from landlords owning tenement-houses, I had the privilege, in 1877, of reading a paper before this Association presenting this view. And, as a corollary of this view, the further ground practically taken in that paper was, that the solving of the problems of concentrated residence is rather hindered than furthered by too hastily laying blame for evils where, perhaps, blame is not due; as, for instance, in esteeming that landlords are responsible, or chiefly responsible, for tenement-house evils. It seemed to me that, by blaming and directing indignation against landlords, inquiry and effort are diverted away from a true and more practical view of the subject, and so are directed away from the further inquiry and study through which the most lasting beneficial results may be hoped to be obtained.

Far from crowding being an advantage to the landlord, the wear and tear of his buildings is less when fewer people live in them. Landlords do not crowd tenants into places, large or small. They only open the doors, and the tenants crowd in. The overcrowding complained of in New York, Brooklyn and Jersey City, for instance, is in general due to causes for which the landlords are in no way more responsible than as all of us are responsible for results of conducting business on business principles. The current price of space in houses is, like the current price of flour or bread, governed by the law of supply and demand. In charity, the landlord may give away space, just as the flour merchant may give away flour, or the baker give away bread. But we have no more right to demand charity in the one case than in the other.

So far as this is conceded, the problem is simplified in that it remains not a moral problem, but merely a mechanical one.

If the evil of a lack of air and light, for instance, is even generally, though not invariably absent where there are no tenement-houses, and yet, if the landlords who own tenement-houses are not responsible for the tenement-house system which has developed this evil, where does the responsibility for this evil rest? The responsibility, as stated in a paper I read before this Association in 1877, rests with the civic enactment, which, in New York nearly a century ago, and somewhat later in Brooklyn and Jersey City, imposed on those cities their inflexible, deep, big, close-backed lot system. And behind that enactment was the sovereign people, seeking the beauty of order and a simple, orderly and symmetrical lot system, yet blindly bringing about the hideousness of disorder — the disorder of suffering, of needless suffering, suffering absent in greater cities where this orderly street and lot system is absent, and bringing into a city, by nature hygienically one of the most favorably placed on earth, *needless* suffering through the loss of one of its best gifts — the almost daily sea-breeze — and thus bringing suffering to all every summer, and to countless little children not only suffering, but even suffocation and death.

Yet whatever the suffering, whatever the restraint of laws, whatever the attractions created elsewhere, still crowds do press in wherever the interest is greatest — the material interest or the mental interest. People will naturally take it for granted that where their fellows most press to be there is something worth pressing for, and which they, if on the spot, may share.

The interest of sovereigns has founded cities in the past — an Alexandria, a Constantinople, a St. Petersburg; the interests of the many, the sovereign people, founds and will found the cities of the present and the future. How are they to be ordered? Is there to be order? Yes, the order that gives the most enjoyment, most subserves the material, mental and social interests of the citizens, while yet it most avoids evils to them.

To find this order is the problem of concentrated residence.

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

SHIRLEY.

[Gelatine Print, issued only with the Imperial Edition.]

For description see article on "Old Colonial Work in Virginia and Maryland," elsewhere in this issue.

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. — MESSRS. CARRERE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

[Issued only with the Imperial Edition.]

THE peculiarities of the site which has been selected for the cathedral, have been carefully considered in order that there may be mutual adaptation and harmony between the building and its locality, taking advantage of the great natural opportunities which this site affords for varied approaches, and for special modifications of the immediate surroundings.

It would seem that under the general law of development, church-life and church-architecture have moved together in mutual sympathy and correspondence. In modern times the Church has been advancing in its life by keeping what was good in the Reformation, and by correcting its excesses. It has been felt that she should do the same thing in her architecture. She should strip the Renaissance of its excesses, and keep what is good in it as the basis for an advance to something better. If the Church would go back to the mediæval in architecture, she must go back to the mediæval in life; for she must live as she builds, and build as she lives.

This principle has determined the style of the design. Aiming to keep the character of the Basilican or first forms of a house of God, and to keep the lofty spirit of the Gothic, but to accept the real advance of the Renaissance style only avoiding its excesses. For this reason the "Transition Renaissance Style" has been adopted.

The subdivision and the arrangement of the interior of the building include the following provisions:

For grand religious gatherings we have the body of the church with the nave, transepts, dome, triforium (gallery), chancel, altar,

bishop's throne and stalls for the clergy, a large choir with a triforium around it, providing for an increased number of singers. The ambulatory admits of processionals around the whole interior of the cathedral.

The grand organ is placed in the gallery at the south end of the nave. There are also two small organs on the north side of the dome.

For daily or Lenten services and for special ceremonies, marriages and funerals, a chapel has been provided in the east transept which will accommodate a large congregation.

To the baptistery a special place has been assigned in the west transept, where it will be available for ordinary and for special baptismal services.

The morning chapel is placed on the east of the chancel, where it will be most accessible from the avenue for daily services. This chapel is of sufficient size to accommodate an ordinary congregation.

For polyglot congregations, or services in different languages, six large chapels have been provided, three on each side of the cathedral, opening into the aisles.

Much care has been given to the arrangement of the approaches to the cathedral. Stairs, inclined walks and drives lead from the different sides of the building directly to the grand vestibule and to the several entrances. On the south front, half-way or resting-places in the form of semicircular porticos, to be decorated by memorials, have been made a feature of the foreground.

North of the cathedral a separate building for the chapter-house has been provided.

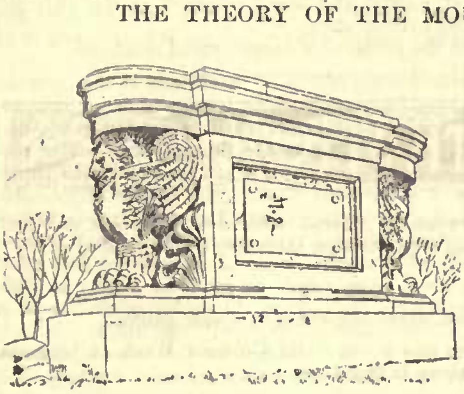
COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. T. P. CHANDLER, JR., ARCHITECT, PHILADELPHIA, PA.

[Issued only with the Imperial Edition.]

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. W. S. FRASER, ARCHITECT, PITTSBURGH, PA.

IN planning this building the chief care was to keep the floor at the level with the highest point of the site and make the entrance most used the one in the transept, while the proper relative importance of the front was not lost to sight.

THE THEORY OF THE MOULDINGS.



ARCHITECTURAL mouldings are defined by Gwilt as those parts of an order which are shaped into various curved or square forms, but this attempted definition errs by including too much, as there can be no part of an order which is not so shaped — which is not either curved or square. A like objection applies to such an account of the word "moulding" as "a general term applied to all the varieties of outline or contour given to the angles of the various subordinate parts and features of buildings." This definition while too wide in one direction is too narrow in another, since it is manifest that the most important parts and features of a building are quite as susceptible of moulding as the subordinate.

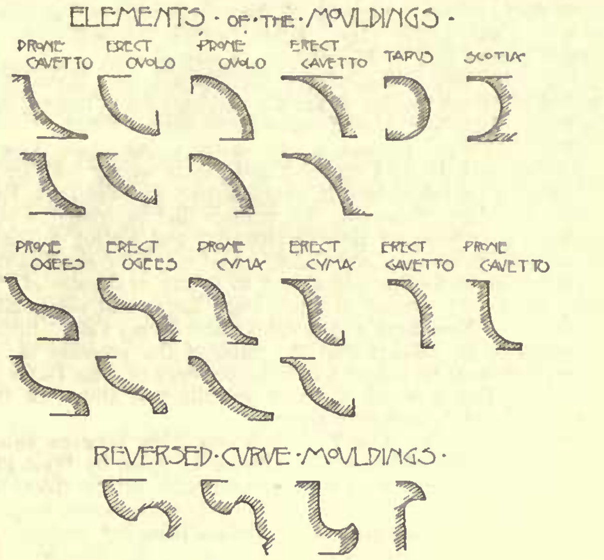
Let us rather say that by moulding we understood the treatment of a portion or the whole of an architectural member, so far as a contour is given to it which is not the simplest that is indispensable for its function but is conferred upon it for the sake of expressive enrichment and beauty.

A moulding, therefore, may often be truly a subordinate member which like a string-course or an architrave band might be removed or suppressed without injury to the structure; otherwise, an elemental member, a cornice for instance, or an archivolt may consist entirely of moulded parts. Such a member is moulded when a profile or section is given to it more varied and elaborate than is at all necessary for its special office, — when curves and offsets replace the continuous right lines and plane surfaces which would be equally serviceable and far more easily executed. The function demanded of a column either Doric or Ionic is in no way helped by the refined and delicately executed fluting of the shaft; the flutes, therefore, come within the definition of mouldings; so also for like reason do the channels, bevels and rustications of masonry.

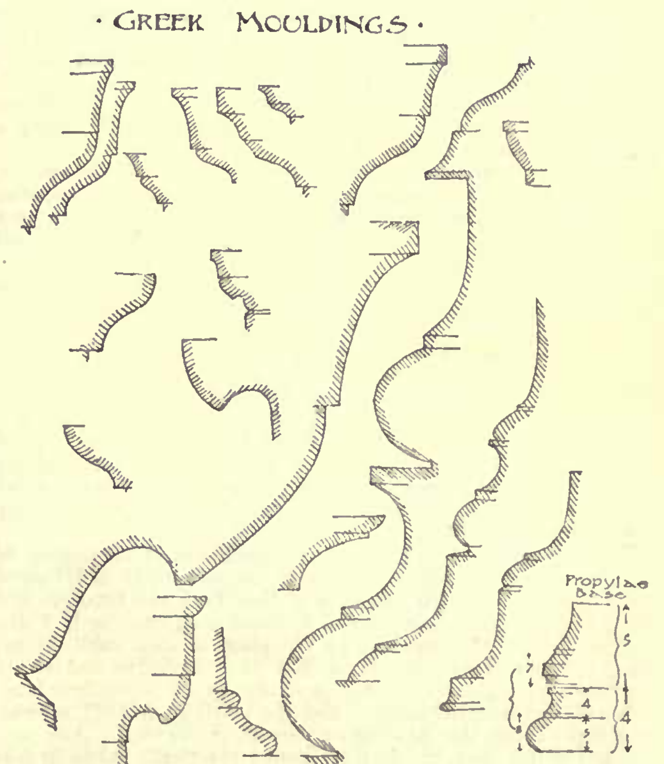
Mouldings are either plain, in the sense that their forms are determined and manifest by a single transverse section; or they are complex; that is, carved either in continuous sequence like the so-called egg-and-tongue moulding, grouped, like the enrichment of capitals or Gothic bosses and finials, or distributed like the crockets or antefixæ.

The most important contribution of moulding to the general effect of architecture is in emphasizing the special sense and function of the architectural member which it is applied to. So it is that a well-designed drip-moulding reinforces the motive of the projecting cornice which carries moisture clear of the face of the wall; the spreading base of a column does a like service to the purpose which is manifest in the increasing diameter of the shaft from above downwards.

These are examples of repetition, a leading resource of emphasis, which testifies to importance as echo testifies to force, while still giving additional distinctiveness to meaning. Repetition here as in discourse, when skilfully varied, attracts and determines a due degree of



attention by implying sustained interest; it is a marked negation of the careless and the casual. To repeat is to insist. Mouldings have a further value as employed to accentuate with happy effect, the limit of an architectural member, and to soften in some special degree the abruptness of transition to the next. A distinctively terminal member pronounces the individuality of the member it pertains to, while as intermediate, it is capable of being treated in a manner to intimate organic relation to another. The capital of a Doric column is unmistakeable as a completion of it as a distinct



member of the order; but the predominance of its horizontal lines brings it into sympathy with the architrave above, while transition from the vertical shaft to the flat abacus is erased by the curved profile of the echinus. The determination of the precise degree of curvature and uprightness to be given to this profile, was an exercise and a triumph of Greek architectural design.

A further use of mouldings is lastly to preclude any sense of cumbrousness or ponderousness.

To what extent it is desirable that a sense of mass or solidity

should be relieved, depends upon the characteristic expression which it is appropriate to realize in a particular building. Clumsiness has to be precluded in any case, and when very large and solid masses are necessarily employed this can only be done by a treatment which exhibits ease and freedom as compatible with energetic mastery. The assurance that great power is exerted effectually without entailing exhaustion, is only satisfactorily evidenced by concurrent manifestation of grace.

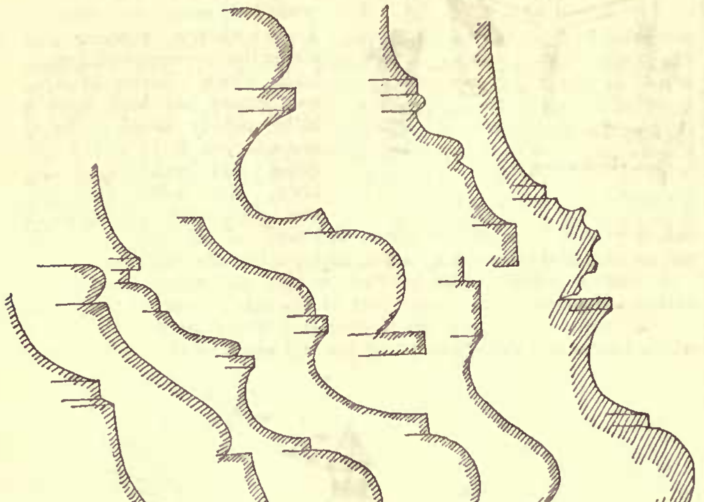
The value of mouldings is largely enhanced by the beautiful effects of reflected light and cast shadows to which they lend themselves under bright illumination, and even under the influence of diffused light; many of their forms also are contributive to embellishment as happily receptive of painted patterns responding to their outlines with graceful variation.

The elementary forms of some mouldings are fully apparent in profile; others are only to be exhibited by a normal section; but all are reducible by analysis to combinations of right lines, of curves, or of both together.

Purely right lined mouldings are either rectangular or such as, involving lines at other angles, may be called splayed. An architrave band or the fascia of an Ionic architrave may exemplify the rectangular moulding; the horizontal section of a triglyph gives a series of splayed mouldings. Narrow rectangular band-like moulding, employed independently, is usually called a fillet; but this term must not be used for a flat returned surface which is adopted merely to obviate the inconvenience of a sharp or thin angle whether due to the meeting of two right lines, two curves, or a right line and a curve. Such terminations are better referred to by such names as right edges or splayed edges, as a rounded outline in like position may be called not a bead but a segmented edge.

Considerable resources of variety are available for architecture even when it accepts restriction to right-lined mouldings. The indispensable element of contrast is at command in varied proportion

GREEK MOULDINGS.



of bands and fillets, and then more importantly as between rectangular and splayed profiles. Stubborn material, limitations of technical appliances and skill and the necessity of speed and of cheapness, may combine to enforce preferential right-lined mouldings, but Norman architecture shows how even under such conditions it was equal to great achievements. The dominant dry severity of the rectangle was tempered by the splay, and then with little more obligation to curvature than cylindrical piers and semi-circular arches. In Greek architecture the Doric style is distinguished from the Ionic by a gravity which owes much to the predominance of right-lined sections and to the simplicity of those curves which it does, with much economy, admit.

Curved mouldings are either concave or convex in section; a given section in outline in itself represents either one or the other.

The curves employed may be regular like the circle, ellipse, parabola, hyperbola, etc., or irregular like curves drawn by hand which are not reducible to any precise rule and principle. Such seemingly irregular curves, however, when they tell as graceful, will usually prove on close examination to have dependence on some latent principle of regularity.

What is known as the ovolo is a convex moulding of which the outline is a segment of a circle not exceeding the quadrant, it may be in character erect as more or less upright, or prone as having its lower edge in advance of the upper.

The same profile which is erect as the limit of a solid in one direction is prone as bounding solidity in the opposite.

The proper segmental ovolo or moulding formed of a portion of a circle, is only one variety of a class; another variety most nearly allied to it is formed of portions of two circles struck from different centres and different diameters.

To another ovolo class are to be assigned the mouldings of which the sections may be elliptical or, as in the brilliant instance of the echinus of Athenian Doric, hyperbolic.

Of the curved mouldings which exceed a quadrant in section, the smaller are known as beads; a larger is a roll or torus, terms which need not be changed even if the roll, as is frequently the case, is struck from two centres.

These convex mouldings again have others concave which correspond to them. The concave moulding of which the normal section is horizontal like that of the flute of a column is a hollow, the convex is a reed; the right edge between two flutes is technically known as an arris.

A hollow which is antithetical to a convex roll, and of which both the terminations are in advance of the extreme recess, is a scotia, whatever the degree of recess or difference of projection between the terminations.

The concave outlines antithetical to the prone and erect ovolo class are those of the prone and erect eavetto; this term may be extended to comprise the same outlines as prolonged and dying into a right line.

The combination of these simple outlines gives us mouldings of reflex curvature which may be classified according to the distinct character as cyma mouldings or ogee mouldings. Each particular type may occur either as erect or prone, accordingly as its upper margin does or does not over-hang the lower.

It will be observed that these combinations admit of infinite variety by differences of proportion: the records of Greek architecture abound in beautiful examples.

Concave and convex curves may be combined on another principle, not as reflexed curves but as reversed. The typical example of this is the Greek drip-moulding, usually known as the bird's-beak moulding; the chief varieties are distinguished as formed by two simple curves, or by a simple associated with a reflex curve.

Some of the forms are found susceptible of application as prone, particularly the combination of a cavetto and ovolo.

Such may be considered to be an enumeration which has some claims to be exhaustive of the elementary mouldiogs. Let us now consider the resources of varied expressiveness and grace which they provide beyond variation of proportion individually. The Greeks — our masters — combined them into sets and systems with admirable effect and it ought not to be impossible to recover from the recorded and recovered examples some insight into the secret of their success.

The simplest scheme of composition of mouldings is the association of exact similars as in a triglyph or the flutes of a column, or of similars with varied proportioo, as in some bases we find a large and a small roll in immediate juxtaposition. The subbase of the Ionic column at Bassæ has a broad prone cavetto superposed on a narrower of a different pitch. The fascias of an Ionic architrave may be taken as coming within the same rule. Otherwise pairs of mouldings of identical type are not to be met with,— certainly not in works of the great period. We do not find cyma upon cyma or ogee upon ogee, either as prone or erect; as little do we find such a union as is frequent in declining Gothic of a cyma curve meeting the return of an ogee or dying into it.

The Greek architect had the same regard for the value of contrast in conferring decision and distinctness and the same mastery of it as was exhibited by the Greek sculptor in the employment of drapery to heighten the effect of the nude and in bringing the fine folds of the chiton into relation with the bolder of the peplus. It were an ill escape from monotonous tameness to cross-purposes. Contrast is distinguished from crude contraction by the subordination of one element for the advantageous display of another and by well proportioned subordination.

After the contrast between vertical and horizontal lines and splayed, the simplest available is between right lines and curves, simple curves, reflexed curves, and reversed.

Groups of mouldings constantly owe much of their charm to the contrast with the right lines and plain surfaces of which they are the proper finish and adornments. The mouldings of a frieze or of the capital of an anta are subordinate in nature to the members they are attached to. But when we regard a composed set of mouldings in itself, the purely right-lined member, as band or fillet, becomes subordinate as introduced to give relief and background to the more varied elements associated.

The cymatium of the Parthenon is a bold simple curve, a segment of a circle, between a crowning fillet and another more than double in width below.

In the string-course over the Panthenaic frieze, the plane band is intermediate between curved mouldings — reversed and reflexed — the hawk's beak above and an erect ogee below. In other cases the positions of the contrasted curved mouldings are reversed.

In the capital of the antæ to the Parthenon posticum a bold hawk's-beak moulding combined with an ovolo and a bead below it is intermediate between a broad fillet with delicate ogee margin above and a broad fascia below.

Rich resources of effective contrast are available in associations even of simple with simple curves. There is ever the marked distinction between them as convex and concave. The apophyge of a

column is a simple cavetto which is very different from the simple roll which it descends upon, while as a simple curve and as involving a partial tendency to circularity it exhibits that modified similarity which is indispensable for the most harmonious contrast. The combination is found again at the summit of shafts of columns below the capitals, in reversed and erect presentation. In other cases a cavetto is shown projecting beyond an ovolo or roll below it: the podium at Tivoli supplies an example.

In these as in other instances presently to be cited there is scope for variation in the relative dimensions of the associated elements and in their relative projection; but the projections always seem to be governed by a furtive relation to a certain line which would gracefully include and circumscribe both.

More complicated harmonies are generated by the association of simple with reflex curves.

The cavetto combines harmoniously with the ogee either as superior or inferior element. It is employed as the superior over and over again in the details of the temple at Bassæ, with marvellous and ever beautiful and appropriate variation of proportions. It also occurs in the lower position — as in the basis of a pedestal at Priene, as prone supporting a prone ogee.

A simple bead below an erect ogee is freely admitted among smaller mouldings and especially as carved, but seldom if ever executed of considerable dimensions.

A small erect cavetto supports the bold erect cyma of the corona of the pediment at Bassæ. I do not trace it in connection with a prone cyma, which indeed is universally eschewed by the Greek architects. Their Roman successors seem to have snatched at it as a chance of novelty, but only to introduce an element of weakness in their bases precisely at the point where vigor is all important. The temple at Tivoli, however, which in many respects has much more claim to be considered Greek than Roman, has an ovolo immediately supporting the erect cyma of the cornice.

A very positive contrast is obtained by the association of a simple and a reversed curve; as an erect cavetto surmounting a bird's-beak moulding. The temple at Bassæ supplies a number of examples beautifully and appropriately varied in proportion.

The cymatium and mouldings of the pediment of the temple, which are drawn and engraved to full size by Cockerell, present a grand system comprehending a union of all the erect and reversed mouldings. The fine predominent sweep of the cyma is bordered, as rim, by a delicate ogee, descends as if by natural return upon a cavetto and below again as easily upon the reflex curve of the drip-moulding.

It is not easy to conceive a nobler example of the skilful employment of proportion to retain variety in due subordination and render all contributory to graceful and dignified effect.

If we care to compare single mouldings to syllables and simple combinations of them to words, we may be satisfied to accept such a disciplined sequence as equivalent to an enunciation pregnant with meaning.

A reflex curve in virtue of the change of curvature involves a contrast within itself. If we mark the point of transition by a right lined break, we resolve the continuous curve of an ogee into a cavetto and an ovolo, a combination closely related to that of a cavetto and a roll or torus.

The reflex cyma is resolvable on a like principle into a combination of two simple curves: the cornice of the Tivoli podium is an example.

The ogee is developed into a proper reversed curve when the concave outline is finished by a sudden return. A prone ogee which is so treated and has also its lower return interrupted, presents a section which is closely related to the combination of a scotia with a torus, or a scotia and ovolo. In some of these modifications it appears to be ambiguous whether we ought to describe a moulding as composed of a shallow scotia and torus, or as a doubly quirked ogee.

It is best however, when mouldings are in question which follow a curve, as in the case of a base, capital, or arch, to adhere to the term scotia.

The fortunes of this combination — scotia and roll moulding — the most positive contrast of concavity and convexity — are more extraordinary than those of any other. It is never applied in Doric architecture, yet it is found in the Mycena column which antedates Doric by centuries, attained to perfect refinement in Ionic and only passed down through one stage of declining art to another, to revive and conduce importantly to the most beautiful developments of Gothic architecture.

The natural development of this subject leads up to the consideration of the principles recognized by the Greeks in the assignment of certain characteristic sets of mouldings to certain architectural members, and also to that of their application of precise proportions in constituting sets of mouldings. Space may at least be allowed for an illustration of the latter point.

Let us examine the base of the Ionic column of the propylæa of which we have exact measurements in Penrose's "*Athenian Architecture.*" We see at once that it can consist of two contrasted members, a channelled torus surmounted in profile by a cavetto, the apophyge of the shaft, and a bolder plain torus below surmounted by a scotia.

The height of the upper paired member is to that of the lower as 5 to 4 precisely. The lower system is then divided between torus and scotia by the same proportion but in reverse order; the scotia being as 4 to the 5 of the torus below it.

The upper torus is subordinated in the lower by the proportion of 7 to 8 with absolute coincidence.

The height of the base from which these subdivisions start is derived from half the lower diameter of the shaft.

W. WATKISS LLOYD.

OLD COLONIAL WORK OF VIRGINIA AND MARYLAND.[1] — V.

SHIRLEY.



THE old manor-house of Shirley stands upon the brow of a low bluff on the north shore of the James, just opposite the mouth of the Appomattox. Westward, across the river, is the ancient settlement of Bermuda Hundred.

The steamers flying to and from Richmond will put in at Shirley landing, or one may reach the old places by way of Petersburg, coming up from the town to City Point by rail and depending on the somewhat uncertain chance of finding a boatman to put one across to Shirley. The row across from the point is charming on a bright morning, the river flowing in a broad and beautiful reach by Shirley. Your wherry, running in under the tree-crowned, grassy bluff which Shirley crowns, soon grates her keel upon a little pebbly beach. In a moment you have scaled this slope and stand upon the lawn, the noble front of the ancient manor-house before you: a great square house, with walls of dull red brick, two stories high and crowned by a tall, high-pitched mansard roof.

A stately portico, also in two stories, pleasantly shades the entrance doors and the middle part of the house from the too-fervid summer suns. Beneath this shelter is a broad stone platform to which four stone steps, extending the full width of the portico, lead up from the lawn. There are four round columns of wood, generous of girth and turned with an evident and graceful entasis. The base of each column is fluted for about eight inches above a square stone plinth. The capitals are quite flat. The neck is encircled by a delicate astragal. The abacus is square, with slight thickness lessened in effect by a cyma on the under edge.



A pilaster finishes against the wall on either side, and between the two the whole wall beneath the portico is covered with hard white plaster. The surface of the ceiling is broken into broad panellings.

[1] Continued from page 121, No. 716.

A deep entablature, consisting of narrow architrave, broad plain frieze, and boldly projecting cornice, rests upon the columns.

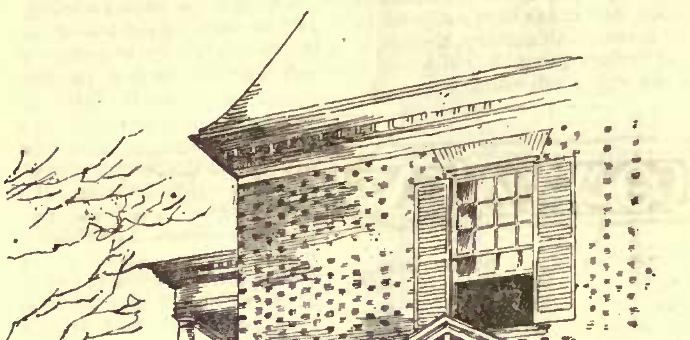
Above are reared the more slender columns of the upper porch, and between them is run a simple balustrade. The upper entablature is a repetition of that below, except that the cornice is richer and of more delicate design, being a continuation, upon the same level of the cornice of the house, and characterized by richer ornamentation of the corona and a strongly projecting course of dentil brackets. The raking and horizontal cornices of the pediment enclose an unembellished tympanum.

The soffit of the roof is panelled and the house wall beneath is plastered as below.

The whole portico, excepting the stone platform and steps, is painted in white. It makes a light and graceful and yet dignified and imposing effect. There is a charming little repetition in half-scale, of this portico, over the side door of the house, which has columns, entablature, cornice, pediment and roof in similar treatment.

The great double portico already described upon the river front repeats itself upon the land-side of the house. Beneath this portico the main entrance opens into the great hall. From the river-side one enters immediately into the parlor.

Absolute symmetry of design characterizes the house in all of its exterior details. The openings in each story are exactly over those



West Porch of Shirley.

below. Even the five tall dormers on the front and rear slopes of the mansard, flanked by the four exactly like them on either end, correspond in width and height with the size of doors and windows in the principal stories.

The walls are carried up to the eaves, two stories from the ground, in small English brick, laid in Flemish bond without break other than the offset of the thicker wall below the water-table and a band, slightly projected and several courses deep, carried around the house at the second-floor level.

The color is a very rich dull red. The windows are broad and high, and have double sashes set in heavy white frames and divided into twenty panes to each window. They have modern outside slat-blinds folded back against the wall, and are provided on the inside with the old-fashioned solid-panelled shutters folding in the depth of the generous reveal, the frames, set well to the outside leaving the thickness of the solid walls within.

Flat brick arches crown the openings. The lines of the old mansard roof are not unpleasing. The attic has a good height, the foot of the rafters is curved outward at the eaves to make a broad overhang, and the dormers rear high-peaked gables over all.

The chimneys cut out of the upper roof and rear a story's height above the edge in two massive oblong stacks. Between the two the roof-peak flowers in a great acorn-shaped wooden finial.

The solid, square bulk of the old manor-house wears a stately, high-born air, standing in the midst of the green lawn, among the great trees, which stretch out spreading boughs high in air above the roof-tree.

On the east side of the lawn, behind a fine old box hedge, is an old-fashioned garden, where vegetables, fruits and flowers mingle in democratic good fellowship — a long garden, where one gets lovely vistas down under the hanging boughs of the peach-trees, where there are a dial, an arbor, and all sorts of delightful things of ancient flavor.

In a new book of Mr. Besant's, "*For Faith and Freedom*," he paints an old English garden, of which the Shirley garden is almost a counterpart:

"In the gardens of the manor-house the sunflowers and the hollyhocks were at their tallest and best; the yellow roses on the wall were still in clusters; the sweet peas hung with tangles of vine and flowers upon their stalks; the bachelor's buttons, the sweet mignonette, the nasturtium, the gillyflowers and stocks, the sweet Williams and the pansies, opened their late summer blossoms to the hot sun among the lavender, thyme, parsley, sage, feverfew and vervain of my lady's garden."

On the north side of the lawn are two brick houses of two stories each in height, containing the kitchen, scullery and other offices, and the quarters of the domestics.

Beyond these a fence shuts off the great, roomy barn-yard, where there are the long, rambling brick stables, the dairy and tool house of brick, queer old log tobacco-houses, and barns and corn-cribs.

In a field beyond the barn-yard enclosure is a charming little columbarium, or dove-cote, a round tower built of brick and crowned by a steep, cone-shaped, shingled roof, ending in an open lantern or belfry-like turret, in and out of which pigeons in white and blue and bronze are flying and flashing in the bright sunshine.

Within the barn-yard droves of turkeys are stepping about, regiments of white geese hissing as they march; files of ducks in bravely glistening green and gold waddling hither and yon; clucking hens leading their fluffy broods in quest of the unwary worm or chance scatterings of grain; strutting cocks of gallant mien lording it grandly over cackling, chattering, idly wandering wives; here and there a lazy, lop-eared hound stretched asleep where the sun shines warm; and down at the stables the boys, with cheery song and laugh, grooming their horses or washing down the great state-coach.

Beyond the farm premises stretches landward the farm road, under a long avenue of old locusts, across the level fields, through many gates and up a hill, about half a mile from the manor-house, on the top of which is a row of steep-roofed board houses, the quarters of the field-hands in the old happy times before the war.

Shirley differs in some essential points from the other great colonial residences of tide-water James. The plan of the house is, in fact, very like that of some of the ancient *manoirs* of mediæval France. The hall does not bisect the house from front to rear, as usual in houses of the same period, but occupies the whole north-west quarter of the first floor. It is a spacious and handsome hall, and gives an air of baronial grandeur to the house. The principal entrance is beneath the portico on the land-side by a wide single door.

On entering, one has the length of the great hall on his right, with the rich soffit of the stairway overhead. On the left, a broad door opens through the panelled wall into the library or morning-room, a very charming apartment, whose walls are wainscoted from floor to ceiling in panels of considerable size.

Opposite the hall-door is the entrance to the parlor, and opposite this another wide doorway gives upon the portico on the river-side of the house.

A handsome broad stairway, starting in the right-hand corner of the hall, by a door opening out upon the little west porch already described, with three steps up to a first landing, mounts with a luxuriously easy ascent to the second platform, whence it swings out from the wall across the hall until it meets the second-floor level.

The side of the first flight is enclosed by a panelled partition, and a door under the landing opens on the cellar-stairs. The ends of the treads project beyond the partition, and are effectively moulded on the under-side. The exposed soffit of the second run presents, also, a rich ornamentation worthy of note. The bottom step is broader than the rest, and over its rounded outer end the railing swings out in a spiral twist, forming a handsome newel. The rail is carried up with graceful ramps and knees, and is supported on richly-turned balusters, set three to a tread.

As one stands at the foot and looks up through the well, the handsome stairway, springing gracefully from floor to landing, thence to floors above, has a grandly generous and dignified effect. The walls are panelled for their full height above the dado in large panels of white painted wood, as, indeed, is the case in the four rooms on the first floor.

Opposite the foot of the stairs is a door opening into the dining-room, a cheery, bright room in the southeast angle of the house, on the river-side, lighted by four large windows, two of which look upon the western lawn, and two toward the river. Upon the panelled walls of this room hang many interesting old portraits of the famous ones of the race. Among these is a great, full life-size portrait of

George Washington by the painter, Peale, which quite fills up one corner of the room. Washington was not, however, of the blood of the Carters. The open door offers a glimpse down the length of the great parlor toward the southeast corner, in which looms a tall old mahogany clock of Liverpool make, on either side of which hangs the portrait, done by Sir Godfrey Kneller, of an eighteenth-century squire and his lady, who were, if I remember aright, John Carter and his wife, the first Carters of Shirley.

The south wall of the drawing-room has three openings, set in deep embrasures in the massive wall, two windows and a door, the latter giving upon the river portico; and there are two windows in the east wall, from which one looks across the lawn to the box-hedged garden, or has a glimpse through the trees of the broad river glistening beyond.

The drawing-room has half the width of the whole house. A wide chimney-breast projects into the room from the partition or north wall, and there is a deep, generous fireplace, about four feet high by five feet wide. The facings of the fireplace are of white marble, enclosed in a narrow wood frame boldly carved with the somewhat trite egg-and-tongue motive. Above the frame is set a frieze of convex form richly and delicately carved in a conventionalized design showing flowers bound with crossed ribbons. Above the frieze a narrow mantel-shelf is brought out in well-proportioned members enriched by refined mouldings. The panel covering the breast over the mantel is set around with a deep and richly-carved frame, probably designed to enclose a great mirror.

The three portraits over the mantel are done in crayons by Ste. Memin, a French artist who came to this country about 1789, and who did, likewise, one of the numerous portraits of General Washington. In the angle of wall and ceiling is set a deep cornice, consisting of an architrave marked with light horizontal lines, a projecting fillet, a swelling frieze, a hollow moulding ornamented with delicate, reed-like, horizontal flutings, a course of bracket-dentils, and over all a boldly-projecting corona.

Close study of detail is everywhere observable in the finish of this beautiful room. The base, or washboard, is painted black, while all above is in white of an antique ivory tone. Above the base is set a moulding two inches deep, composed of a number of delicate members. The dado presents a plain, unbroken surface, and is capped by a chair-board four inches deep, moulded in pleasing form. In each of the great panels above hangs the portrait of some fair châtelaine of Shirley, usually displaying a generous expanse of snowy neck, or of burly squires resplendent in curling wigs and falling laces.

Over the door into the dining-room is a broken pediment, much affected in that period, the raking cornices of which are run in graceful curves, ending in a spiral twist and elaborate rosettes. Between them is carved a pineapple in high relief.

On the dining-room side a classic urn stands within the ends of the broken pediment. Glazed transoms of graceful design are set over the outer doors, and over that from the hall into the drawing-room. The massive doors are made in six raised and bevelled panels, with broad styles and rails, and have great rim-locks, drop-handles and other furniture of polished brass. Two centuries of wear and tear had not impaired the perfect condition of the old woodwork, when, in an evil day, the ever deadly, destroying furnace was set up in the cellar, and when it had poured its parching breath for scarce as many months through the stately rooms of the old mansion, great rents began to appear in the large panels, built up of many pieces carefully joined at the edges, and horizontal seams yawned in the broad, plain surface of the dado, mitres becoming unpleasantly obvious here and there, and mouldings shrinking away from their beds.

Shirley was probably so named in honor of the wife of Lord De la Warre, a daughter of Sir Thomas Shirley, of Whiston. Its history is almost as long as that of the colony.

The place was founded by Sir Thomas Dale, High-marshal of Virginia, who came over in 1611 to succeed Lord De la Warre, and who, after establishing his city of Henricus, at Dutch Gap, or Varina, as it was then called, and set it growing behind its palisades, laid out the settlements of Bermuda Hundred and of Shirley Hundred, on the opposite shore of the James. His lordship appears to have been a governor of immense force and untiring energy. He soon rid the colony of the hordes of dissipated idlers who had well-nigh wrought its ruin before his coming. He set them to work, every man of them, and when a number of malcontents conspired together to resist his authority, he arrested and put to death the ringleaders of them by the pleasantly varied methods of "hanging, shooting, breaking on the wheel, and the like," while one pernicious fellow, presumably of doubtful veracity, "had a bodkin thrust through his tongue, and was chained to a tree until he perished."

By means of such novel and convincing arguments did the stern old founder of Shirley persuade the adventurers that he meant to be obeyed, and he very speedily brought the colony into a better state.

In the terrible Indian massacre of 1622 Shirley seems to have escaped without loss.

Colonel Edward Hill, who built his house at Shirley in 1640, was elected speaker of the House of Burgesses in 1654, and two years later lead a force of Virginians with one hundred friendly Indians of the Pamunkey tribe, against seven hundred hostile Riecabecrians who had descended the James from their hunting-grounds beyond the Blue Ridge, and encamped near Richmond, greatly alarming the settlers.

Colonel Hill fell upon their camp and fought a great battle, but he was routed and fled in great disorder, leaving among the dead upon the field his faithful ally, Totapotomoi, Chief of the Pamunkeys.

Twenty years later, in Bacon's Assembly, the widow of the fallen brave appeared before the Burgesses to answer, as "Queen of the Pamunkeys," a demand upon her tribe for fighting men to help the colonists against the threatening redskins. She was accompanied by her stripling son, "whose father was said to be an English colonel," and dressed in the picturesque splendor of the savage she bore herself with royal mien, replying to the questions of the Burgesses in "a high, shrill voice, and with vehement passion — Totapotomoi Chepiak — Totapotomoi is dead." Her words were interpreted to the assembly by Colonel Hill, of Shirley, the son of the hero of the Riecabecrian fight.

Shirley passed into the hands of the Carters with the marriage of John Carter, a son of "King Carter of Corotoman" to Elizabeth Hill, who inherited her father's estate and manor-house of Shirley.

A sketch of the great genealogical tree which, from the parent stem at Shirley, has shot out branches covering the whole of Tidewater, Virginia, is not to be attempted in a paper of limited scope. The family boasts a vast connection, indefinitely extended by intermarriages among the great families of the neighboring boroughs and parishes. The age of the manor-house of Shirley has been variously stated, and it has been assigned to a date as early as the middle of the seventeenth century, though it is far more probable and indeed quite evident, that the old house does not antedate the first quarter of the eighteenth century. A. B. BIBB.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE PHILOSOPHY OF THE ATTEMPT ON CENTRAL PARK.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In the *American Architect*, as a leading organ of constructive art, I ask room here to record the view that the proposition to use any part of the pretty garden of the people in New York, known as the Central Park, for any temporary or permanent use connected with an exhibition, or for any other use injurious to the present one (as if any other use of the space *could* be as good as the present one), is one of the most striking of recent evidences of the hopeless vulgarity of the human race. Hopeless, for we find instances of magnanimity among unenlightened and savage peoples, and even in animals. Yet magnanimity is based on an exalted perception of that wherein is the residence of values. The lack of that perception inspires those who, as in this instance, wish, whether they succeed or not, to destroy a greater for a lesser good, and has inspired those who, through selfishness, stupidity or from whatever motive, have destroyed art values throughout history. But for this we should *possess* the Seven Wonders of the world, instead of only knowing but their names; we should possess the Alexandrian Library, the Parthenon in perfection; indeed, all that is most worthy of admiration in man's past. For one instance where, as in the loss of the Pink Terraces of New Zealand in the earthquake of 1887, Nature has robbed us of beauty, we have lost a thousand through the vulgarity of man. But though men will, like the ourang-outang and other simians, always have an itching to destroy what he cannot replace by anything better, which is the lowest form of the constructive instinct, yet the estimate of individual men as to the use of destroying will, little by little, as civilization advances, be less and less respected. Each man will be compelled to limit the manifestations of his instincts more and more to instances where he can do no harm to others; and the automaton of the future will be no more permitted to destroy for a generation nearly half of the pleasure-garden and health-resort of a vast population than we should now permit Herod to kill off the first-born in every house in order to keep himself on the throne. I have no wish to blame these gentlemen in New York or to blame Herod — both are products of their time — but to point out what is (in my view, and, since spontaneous, probably in the view of many others) the philosophic explanation of the conduct of both alike, and of all destroyers of objects of beauty. AN ARCHITECT.

THE RICHARDSON BIOGRAPHY.

BUFFALO, N. Y., September 16, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you kindly inform me through the columns of your paper whether the work on the late H. H. Richardson, by Mrs. Schuyler Van Rensselaer — Houghton, Mifflin & Co., — publishers,

has attained the fabulous value of $200.00 per copy? I have been so informed, and wish to learn from a reliable source, if true.

Respectfully, Ulysses G. Orr.

[The book can still be obtained of the publishers at the original price of publication, $20.00. — Eds. American Architect.]

NOTES AND CLIPPINGS

The Canal of Joseph. — How many of the engineering works of the nineteenth century will there be in existence in the year 6000? Very few, we fear, and still less those that will continue in the far-off age to serve a useful purpose. Yet there is, at least, one great undertaking conceived and executed by an engineer, which, during the space of 4,000 years, has never ceased its office, on which the life of a fertile province absolutely depends to-day. We refer to the Bahr Joussuf — the canal of Joseph — built, according to tradition, by the son of Jacob, and which constitutes not the least of the many blessings he conferred on Egypt during the years of his prosperous rule. This canal took its rise from the Nile at Asiut, and ran nearly parallel with it for nearly 250 miles, creeping along under the western cliffs of the Nile valley, with many a bend and winding, until at length it gained an eminence, as compared with the river-bed, which enabled it to turn westward through a narrow pass and enter a district which was otherwise shut off from the fertilizing floods on which all vegetation in Egypt depends. The northern end stood seventeen feet higher than low Nile, while at the southern end it was at an equal elevation with the river. Through this cut ran a perennial stream, which watered a province named the Fayoum, endowing it with fertility and supporting a large population. In the time of the annual flood a great part of the canal was under water, and then the river's current would rush in a more direct course into the pass, carrying with it the rich silt which takes the place of manure, and keeps the soil in a state of constant productiveness. And this, with the exception of the tradition that Joseph built it, can be verified to-day, and it is not mere supposition or rumor. Until eight years ago, it was firmly believed that the design has always been limited to an irrigation scheme larger, no doubt, than that now in operation, as shown by the traces of abandoned canals and by the slow aggregation of waste-water which had accumulated in the Birket el Querun, but still essentially the same in character. Many accounts have been written by Greek and Roman historians, such as Herodotus, Strabo, Mutianus and Pliny, and repeated in monkish legends or portrayed on the maps of the Middle Ages, which agreed with the folk-lore of the district. These tales explained that the canal dug by the ancient Israelite served to carry the surplus water of the Nile into an extensive lake lying south of the Fayoum, and so large that it not only modified the climate, tempering the arid winds of the desert, and converting them into the balmy airs which nourished the vines and the olives into a fulness and fragrance unknown in any part of the country, but also added to the food-supply of the land such immense quantities of fish that the royal prerogative of the right of piscary at the great weir was valued at $250,000 annually. This lake was said to be 450 miles round, and to be navigated by a fleet of vessels, while the whole circumference was the scene of industry and prosperity. — *Engineering.*

The Value of Covering Steam-pipes. — In the *Michigan Engineers' Annual*, which is the report of the proceedings of the Michigan Engineering Society, of January, 1889, Prof. M. E. Cooley, M. E., of Ann Arbor, gives the following experience on the value of covering steam-pipes: "The benefits of covering steam-pipes to prevent radiation, are strikingly illustrated by the following example: The Thomson-Houston Electric-Light Plant, in Ann Arbor, has about 60 feet of 7-inch pipe, connecting the boiler with the engines, and two large steam-drums above the boilers. In March, 1887, the steam at the far end of this pipe was tested to determine the amount of entrained water, the pipes and drums at the time being uncovered. An average of nine experiments gave 31.01 per cent of moisture. In June of the same year, after the pipes were covered with magnesia sectional coverings, the quality of the steam was again tested, the average of five experiments giving 3.61 per cent moisture. The tests were made by the same men, from the same connections, and in the same manner. The pipes and steam-drums in March were subjected to a draught, which, of course, aided the condensation. Enough water passed into the cylinders to retard the engines, producing a disagreeable noise. In June, the weather was warmer, and the pipes and steam drums were well protected; the quality of steam at the boilers was tested in June, and showed about 3 per cent of moisture. Assuming that 100 I. H. P. were being developed at the time, and that each horse-power required 30 pounds of steam per hour, we would need 3,000 pounds of steam. If the steam is assumed to have 25 per cent entrained water, due to condensation in the pipes and connections, then 4,000 pounds steam will need to be produced in the boilers, or 1,000 pounds more than necessary. To produce this steam will require about 125 pounds of good coal per hour, or 1,000 pounds per day of eight hours. One-half ton per day, at $3 per ton, for 300 days, equals $450, which at 6 per cent, pays the interest on $7,500. The actual cost of the covering, put on complete, probably did not exceed $150.

The Largest Draw-Bridge. — The Shore Line Railway bridge at New London, the largest swing-span draw-bridge in the world, is now in position. It was built parallel to the shore along the fender pier, so as not to obstruct navigation, and was swung into place half an hour before sunset Saturday afternoon. It is of solid steel, weighs nearly 2,500,000 pounds, and its connecting parts, when the bridge was swung into position, shot into the mortises of the bridge proper with absolute precision. This was a great relief for the anxious engineers. Some of the highest engineering skill ever employed in bridge-building has been used in the construction of this bridge, the situation involving peculiar difficulties. In some places, 56 feet of water and 80 feet of mud were found where the piers must be set. There great timber curbs were constructed and sunk to the total depth of 137 feet. After scooping out the interior mud, the curbs were driven full of piles. These, cut off at a level midway in the curbs, were bound solidly together by filling the spaces with concrete. On this rock-like basis the masonry of the pier was built up. The centre pier is an immense structure 71 feet square. It is flanked on either side by spans of 310 feet, and there are two other spans at either side of the river of 150 feet each. The unusual length of draw was required by the United States Government that there should be no obstruction to the passage of the naval fleet to the Thames naval station farther up the river. This great bridge, 1,422 feet long, crosses the Pequot River (imitatively named by the first settlers the Thames, while they, quite as foolishly, named Pequot New London) from a point at the terminus of the Yale-Harvard regatta course at Winthrop's Point, at the upper part of the town. — *The Iron Age.*

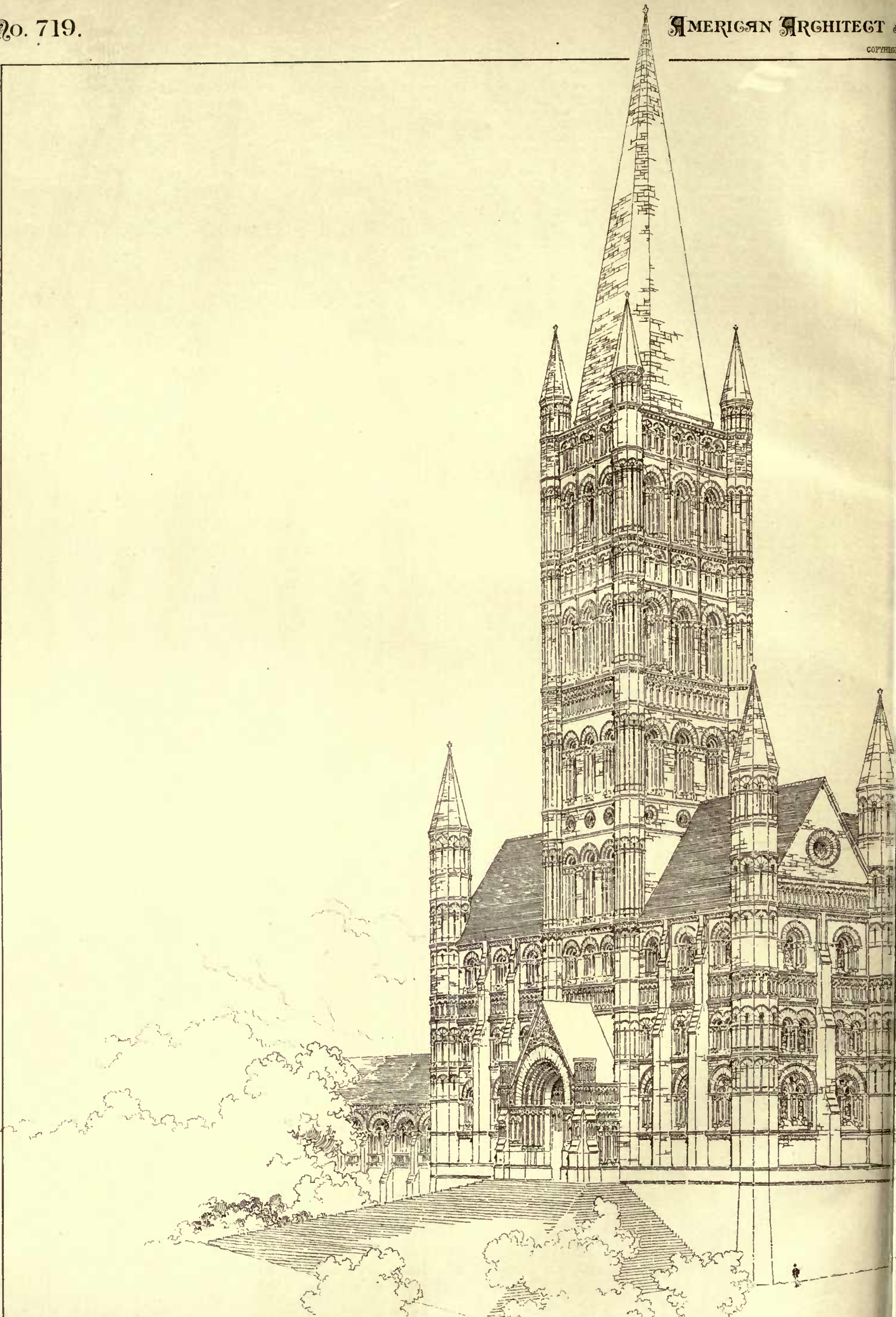
TRADE SURVEYS

If the business plans and purposes under consideration among a great majority of the business men of the country could be known, it would appear that the chief question now under consideration is, Shall a general expansion of production be entered upon? The temptation to expand is most inviting, but the dangers which experience show are necessarily involved to check enterprise, or rather hold in check those managers who are almost inclined to take the risk. The manufacturing interests know that an accumulation of stocks beyond a certain point means not only a drop in prices of from 5 to 10 per cent, with a corresponding depreciation in many other directions, but that it means restricted buying, withdrawn enterprise and enterprises, lowering wages and general instability, in addition to financial complications. To maintain an even balance between production and actual consumptive requirements is the problem which practical economists wish to see the solution for. It is encouraging to note how much self-restraint is exercised among competing producers all over the world, and how much good use is being made of the dearly-bought experience of past decades. That an increased output will be made this winter none need be told who watch behind the scenes. The fact is that a general advance in prices is threatened, so many assert, simply because there are not sufficient manufactured products on hand to cover a sudden spurt of demand. Right here is an error which the commercial mind is most apt to make. True commercial wisdom demands no accumulation, and the tendency of the day and hour is decidedly in that direction. The growth of trade organizations of all kinds is also contributing in that direction. The business world is learning to gauge its effort to meet current requirements, but the importance of the lesson is slowly learned. The anticipation of wants stimulates productive capacity artificially, and encourages capital to enter upon a work where its service is not needed. Besides, the old method of manufacturing until a gorge of productions arrested trade, creates alternative abundance and scarcity of capital, higher rates of interest and narrower margins to manufacturers. The present trade condition could be strengthened by the elimination of some elements of cost, such as higher than necessary cost of raw material, and a higher cost for money or credit than an enlightened financial management would tolerate. There are quite a number of barnacles that some day will be more clearly recognized than now, but they will not be generally observed until there is a corresponding intelligence and capacity to remove them. October opens with abundant promise of prosperity, especially to the little people who are operating with a few thousand dollars and a few workmen. There has not been such a favorable opportunity for years for starters in commercial life or in manufacturing, but the opportunity is offered only to the limited number of practical men who have become familiar with the most improved methods for supplying the wants of man. The iron and steel makers are barely able to cover pressing demands. Crude iron is advancing in Western markets. Last week railroad-builders bought, or contracted, for 75,000 tons of steel rails.

Buyers of billets, slabs, etc., are hurrying in orders for large blocks of material for winter delivery. In some portions of the country a car famine prevails, and it is estimated that before December 1 orders for 20,000 cars will be placed, which means a demand for 600,000 tons of iron and steel products. The demand for merchant iron and steel for all purposes into which such products enter is increasing week by week, but prices for the most part remain uniform. The lumber manufacturers report the result of the year's business thus far as fair, but prices are weak at present, because of the willingness of large holders to unload for cash. The makers of shop and mill machinery, especially in the Western States, have more work in sight than for years; but, in spite of this, there is only a slow expansion of machinery-making capacity. Tool and implement makers are preparing to meet next year's demands, which, it is thought, will be very heavy. The railroad companies are being crowded with traffic in agricultural, mineral and lumber sections, and the movements of general merchandise are very large. The boot and shoe manufacturing interests, the paper-making interests, the textile-goods interests, and a host of other great interests are all looking forward to a greater demand next spring than has ever been enjoyed, but everything points to only moderate profits. Textile manufacturers hope to harmonize all interests in contemplated tariff adjustments. Wool-growers are preparing to contest for the mastery, as against foreign interests. Coal-miners are opening-up enough new territory to add ten million tons per year to our coal-supply. New banks are being started in the West, and money-lenders are making connections in the newer sections of the country that promise much aid to safe borrowers. Farm mortgage schemes are attracting public attention, and possibly some method of governmental supervision will be devised to secure protection to investors. The West is growing more and more financially independent of Eastern assistance, but the multiplying opportunities in these new localities will continue for years to absorb Eastern savings under protective legislation. The evils of existing systems of lending or investing money will be remedied and the outflow will continue, to the mutual advantage of both sections.

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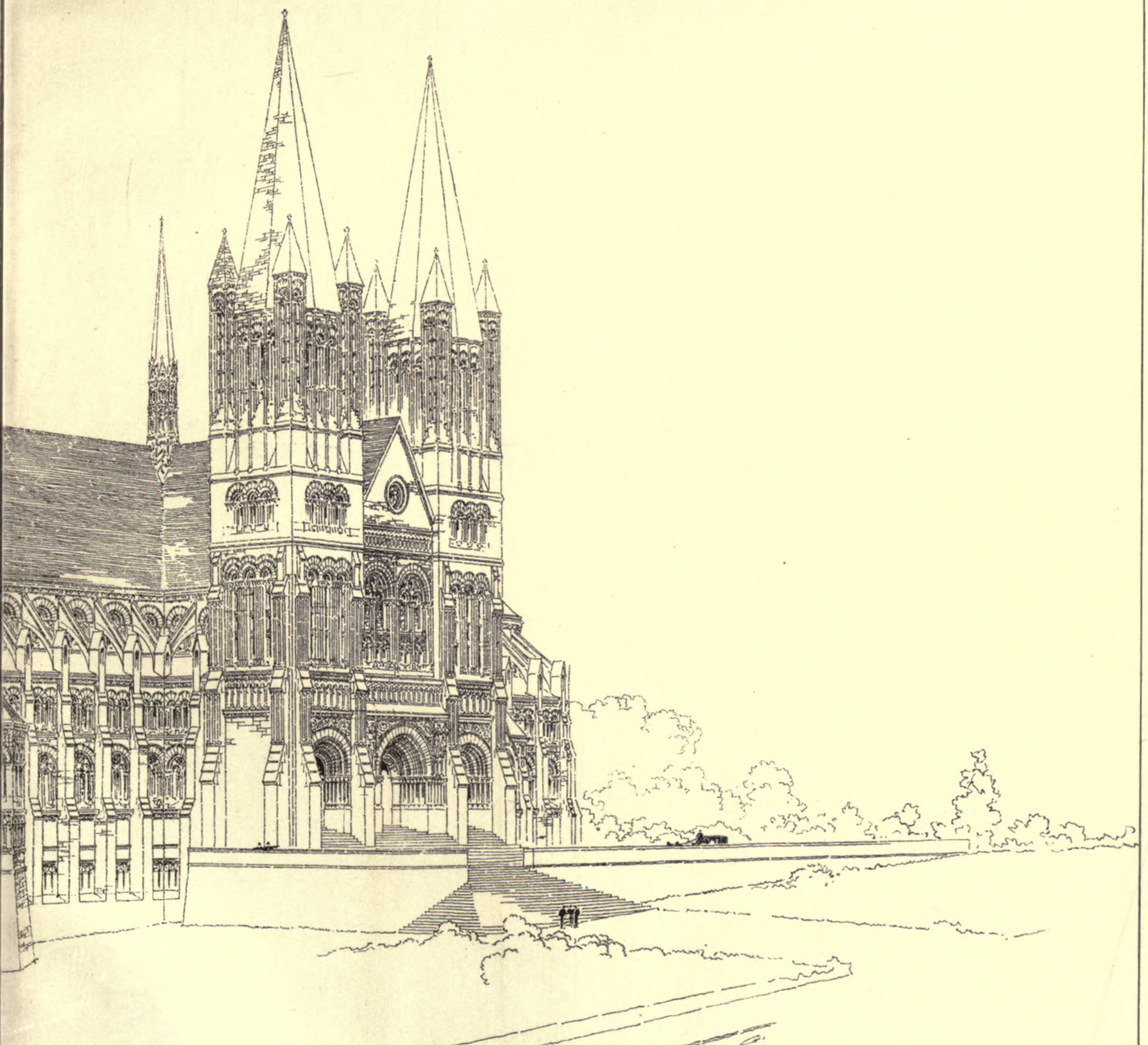
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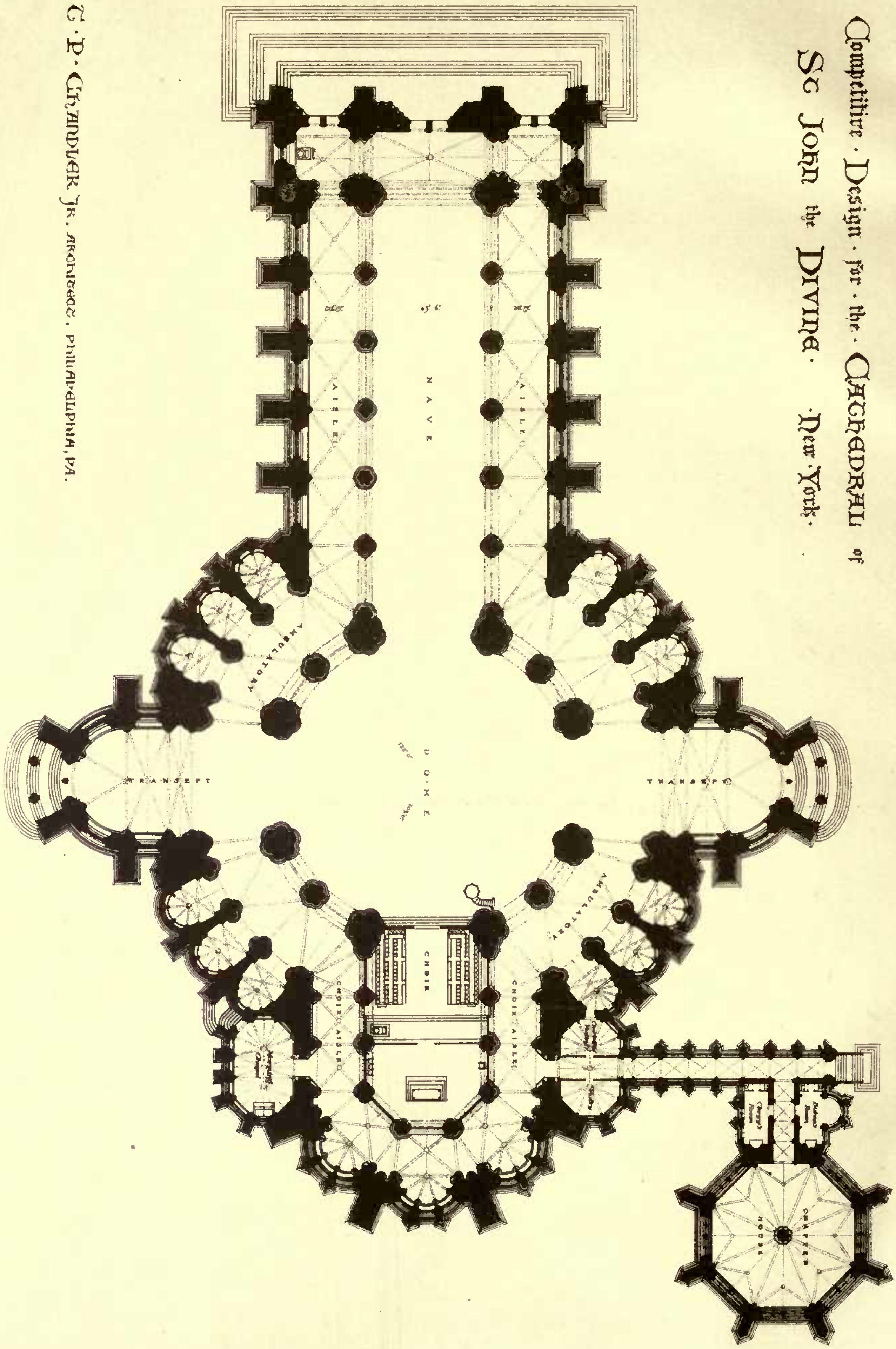
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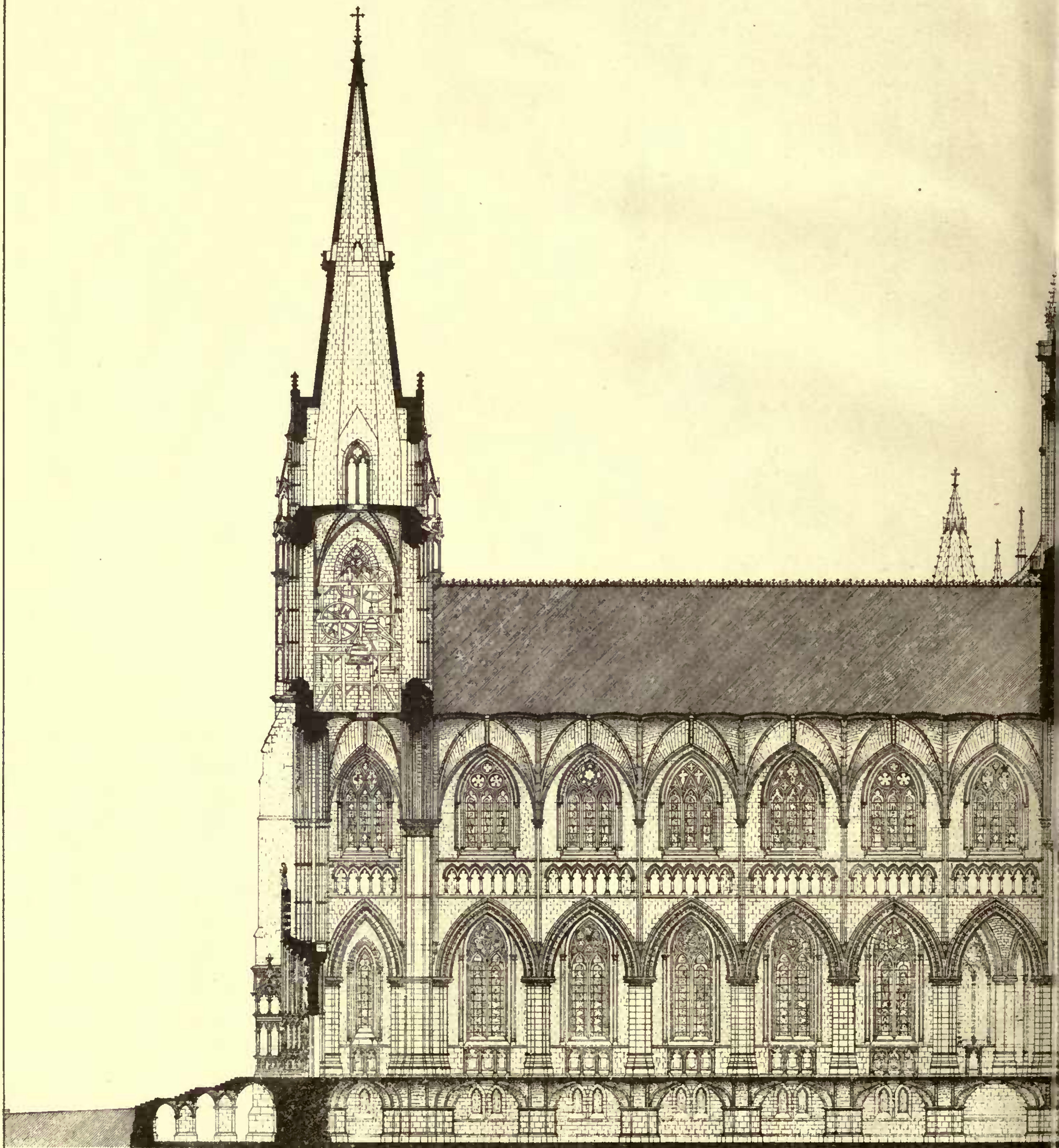


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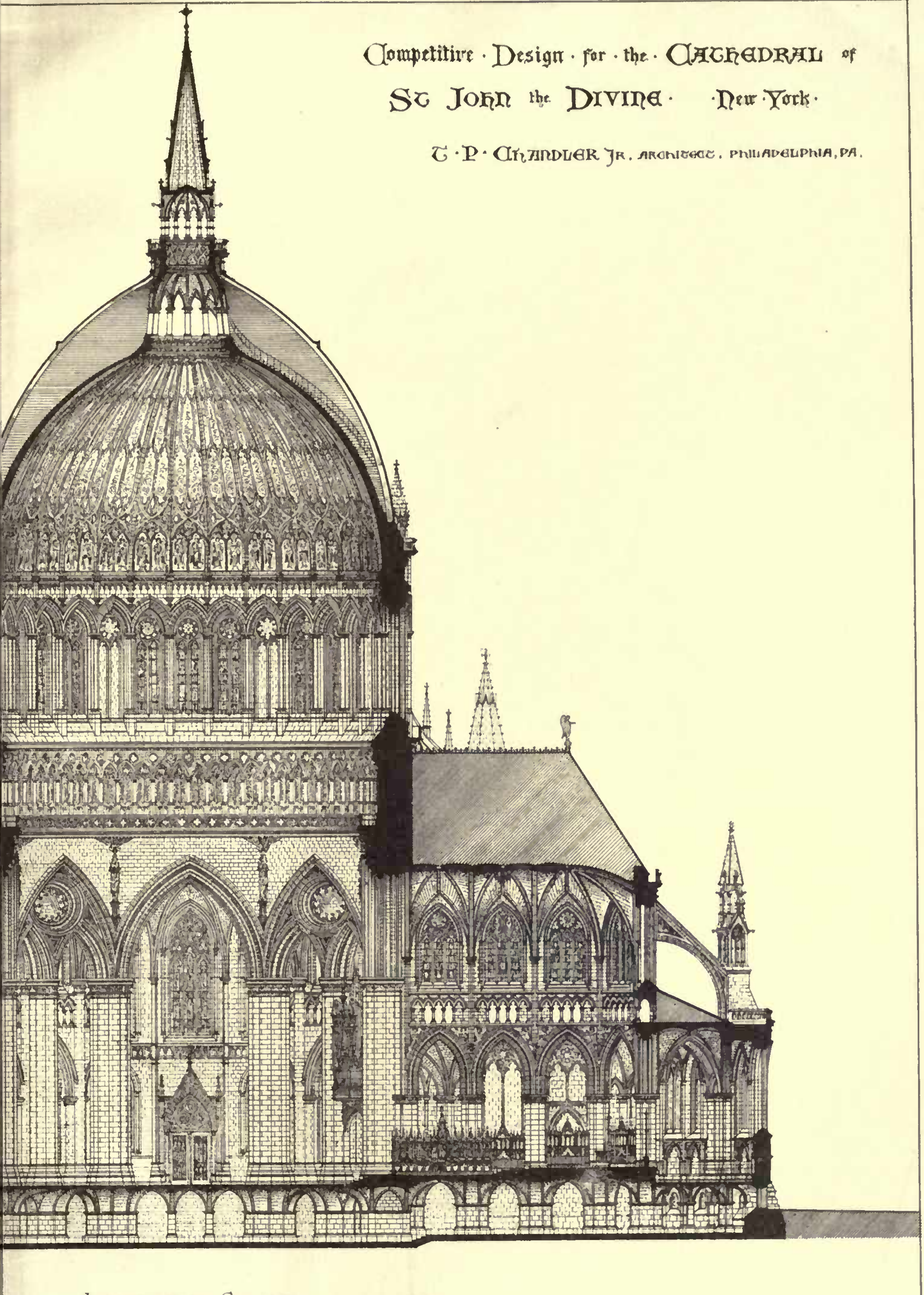


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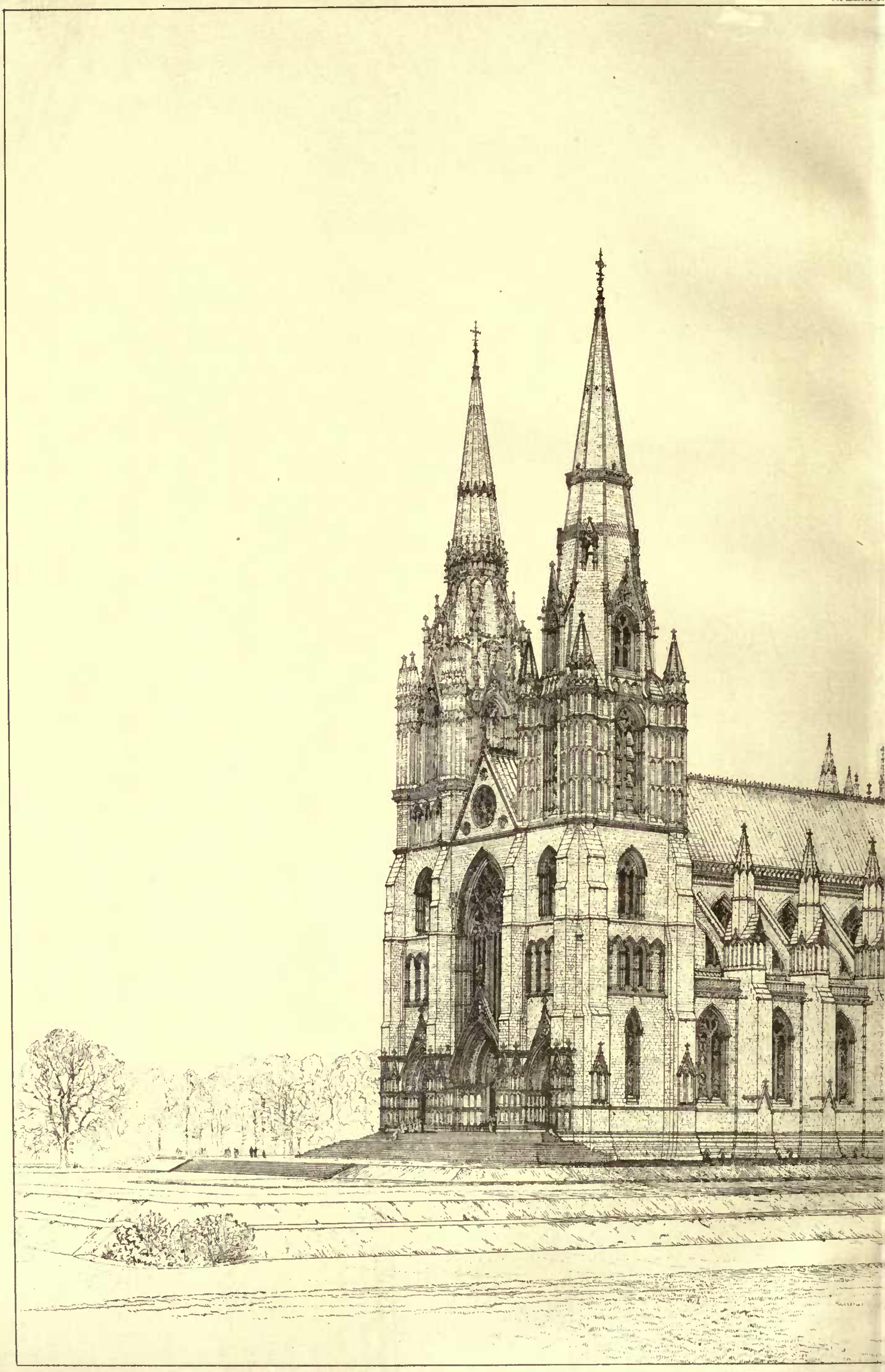
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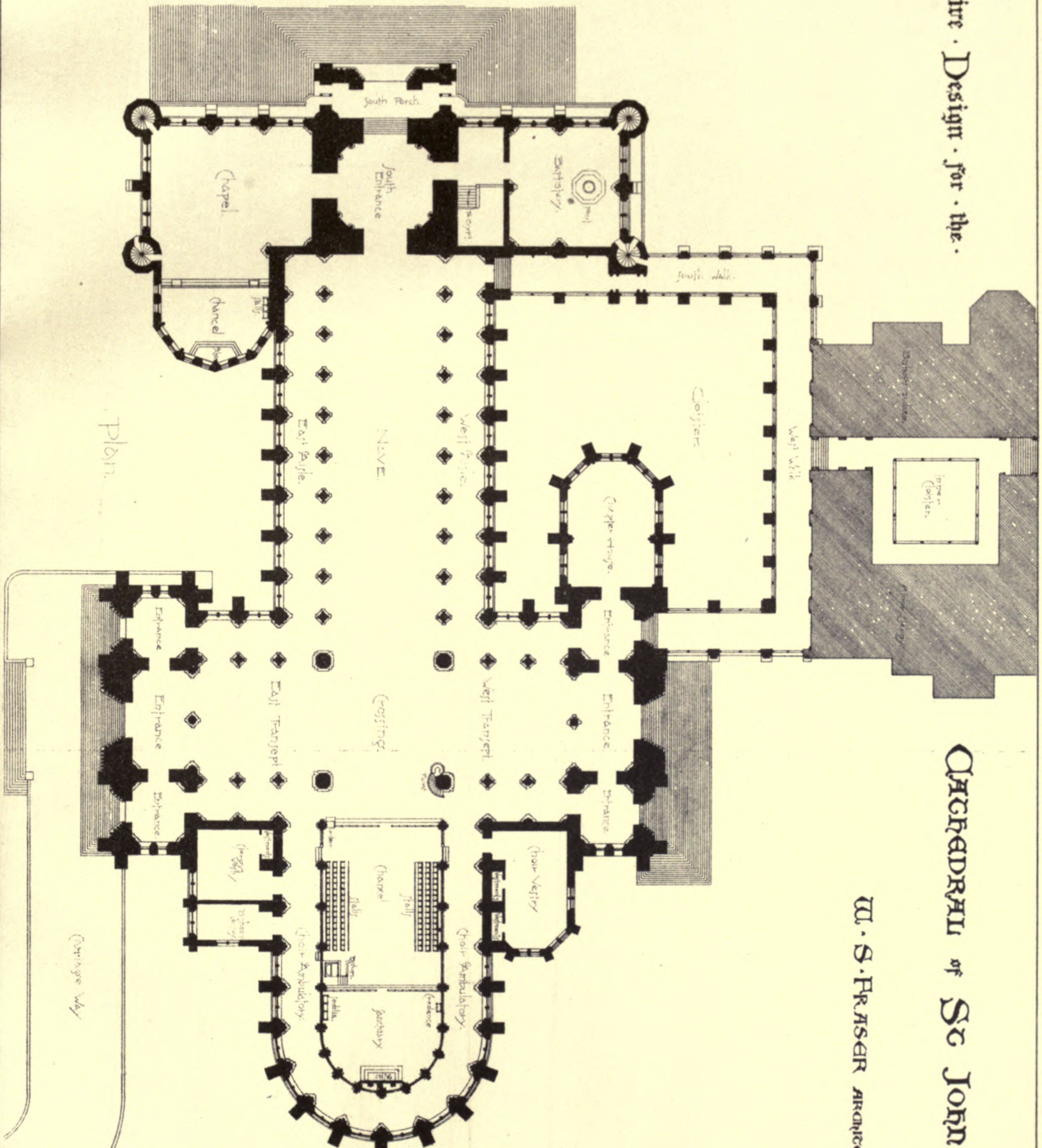
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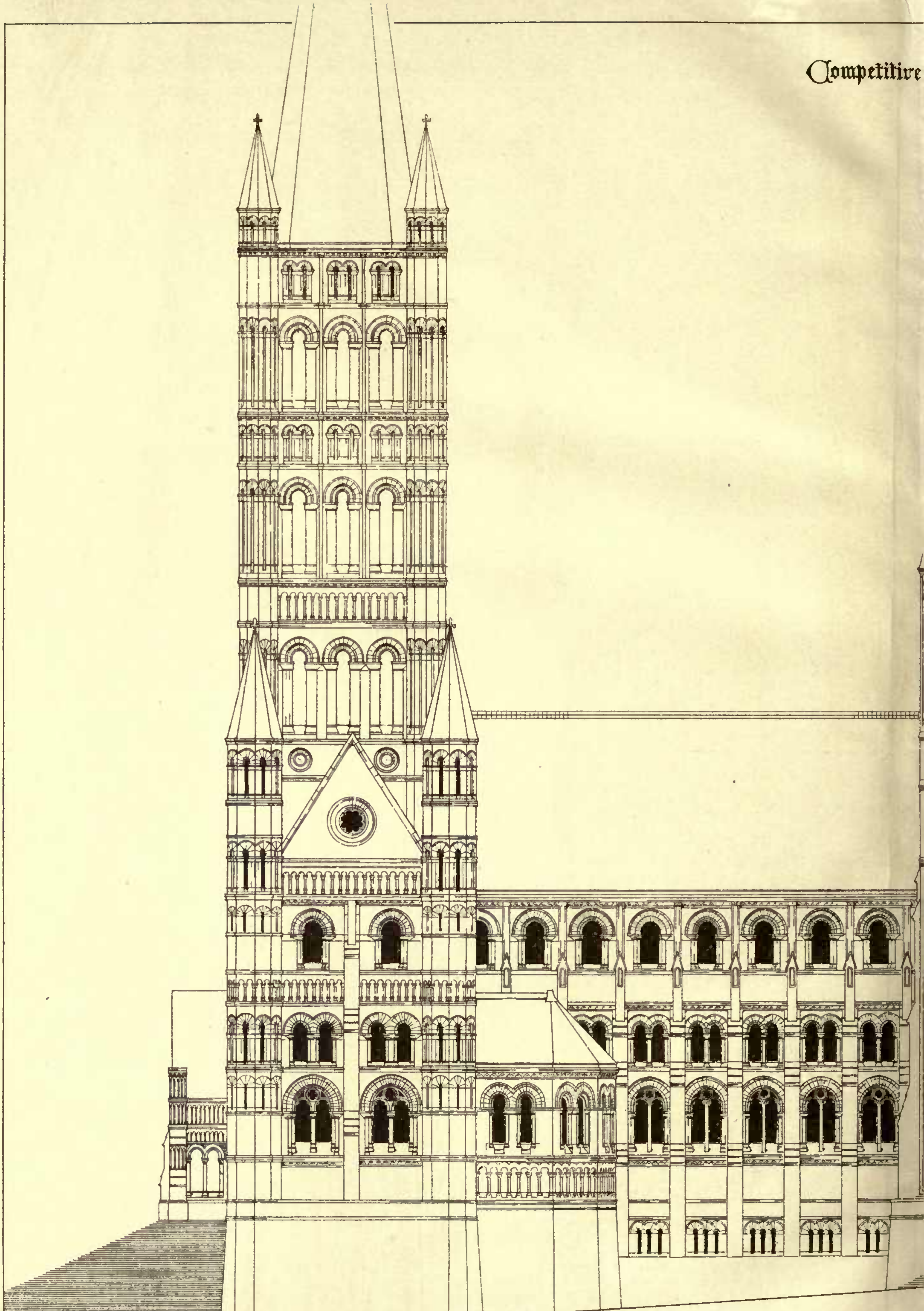
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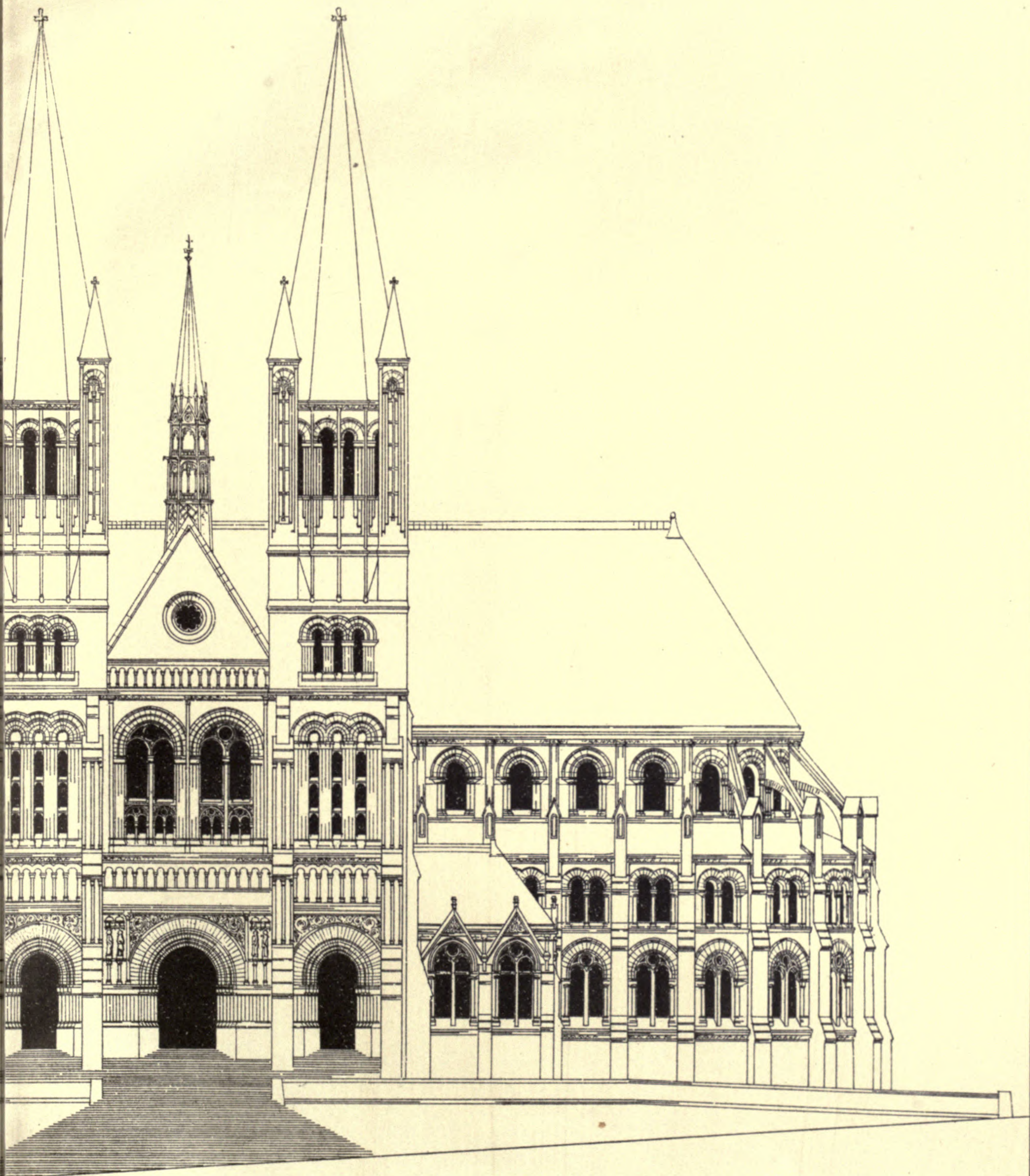


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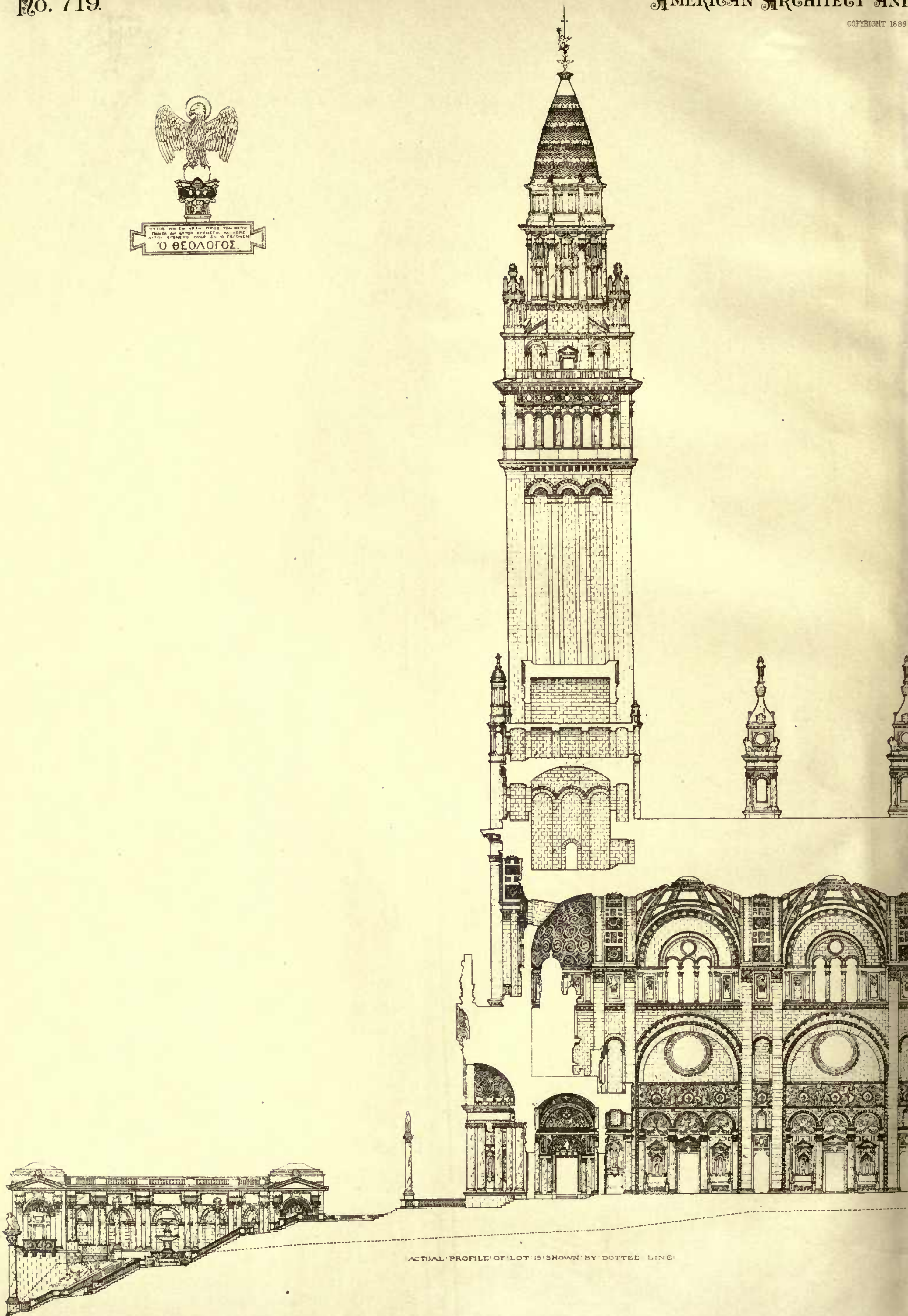
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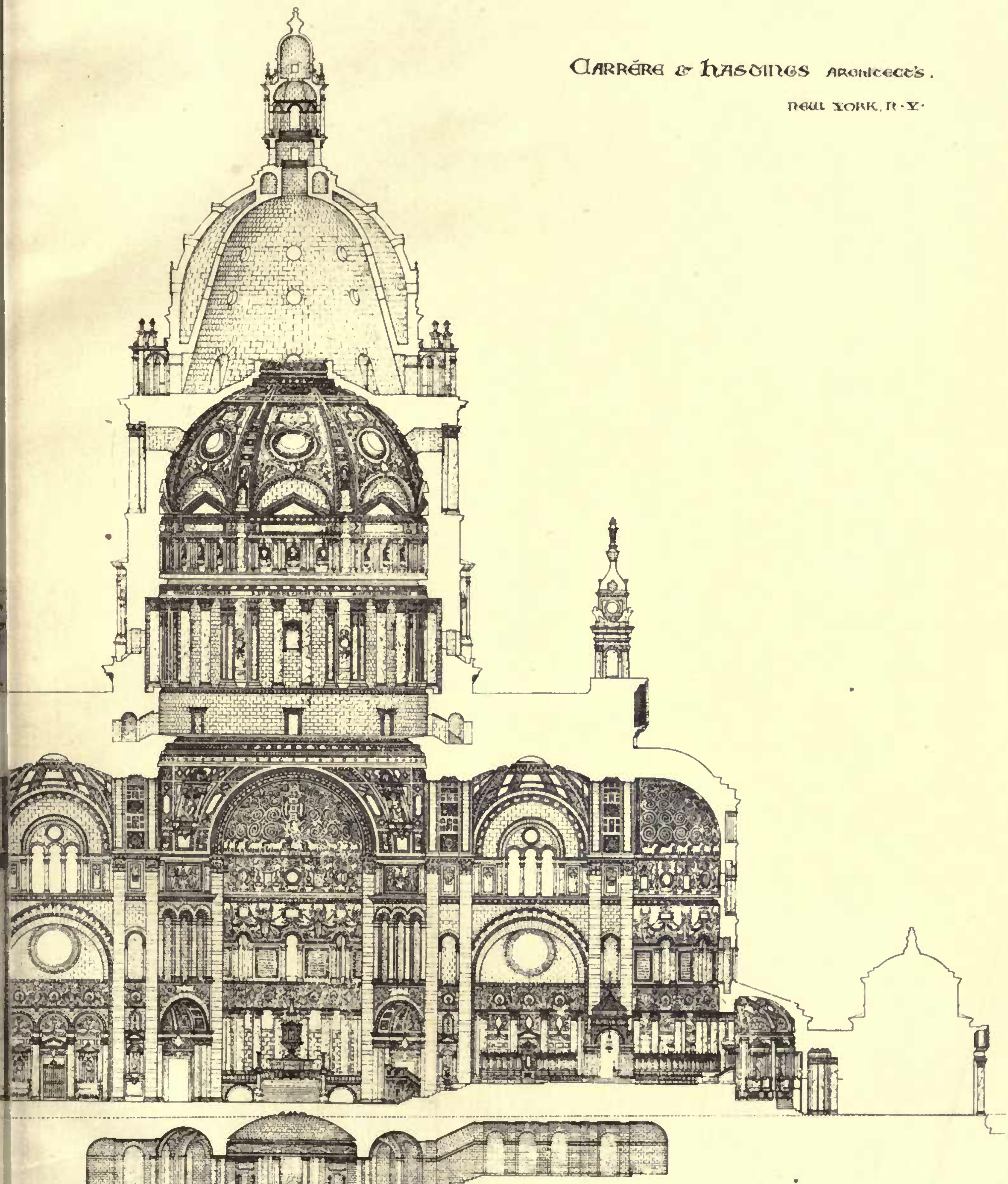
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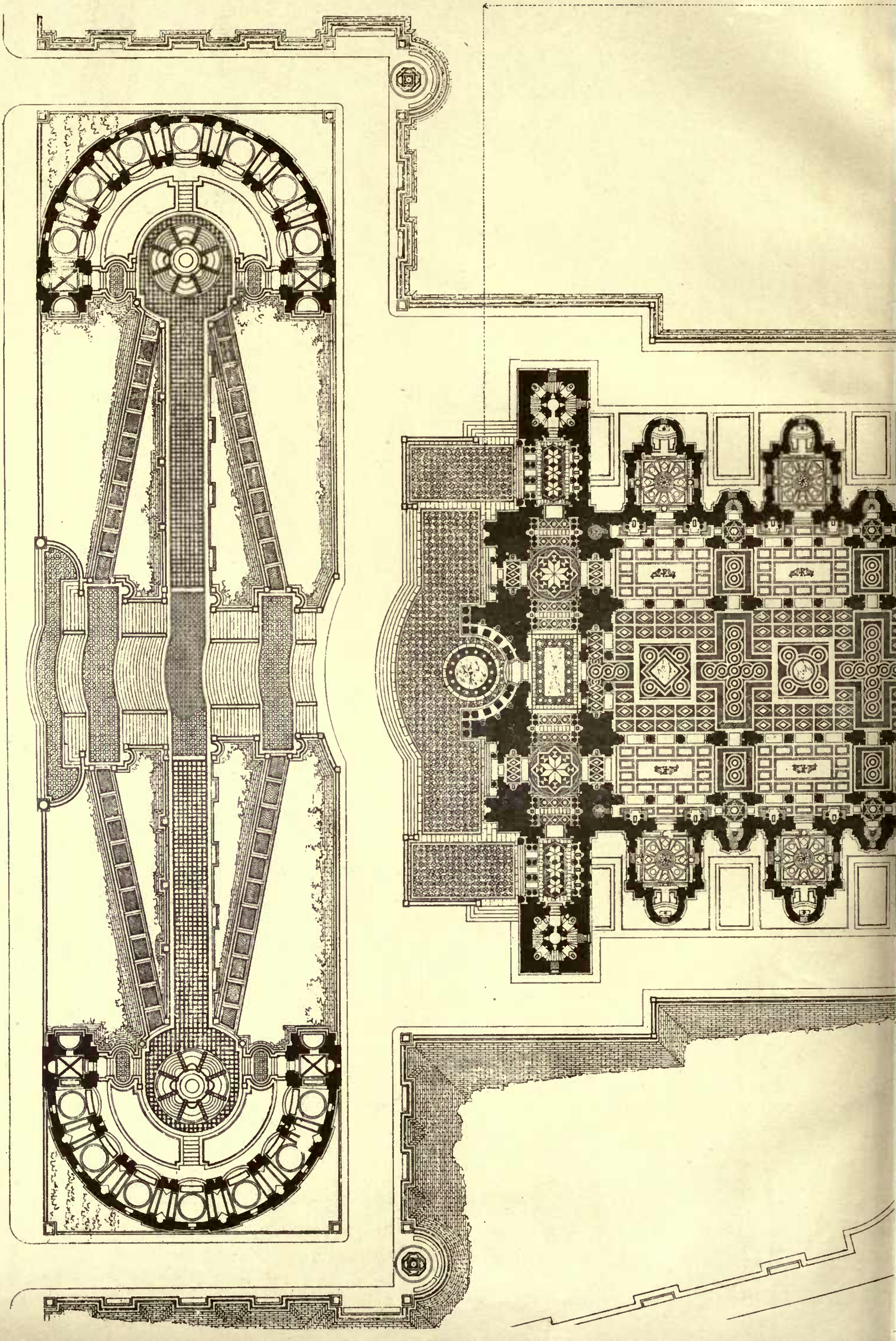
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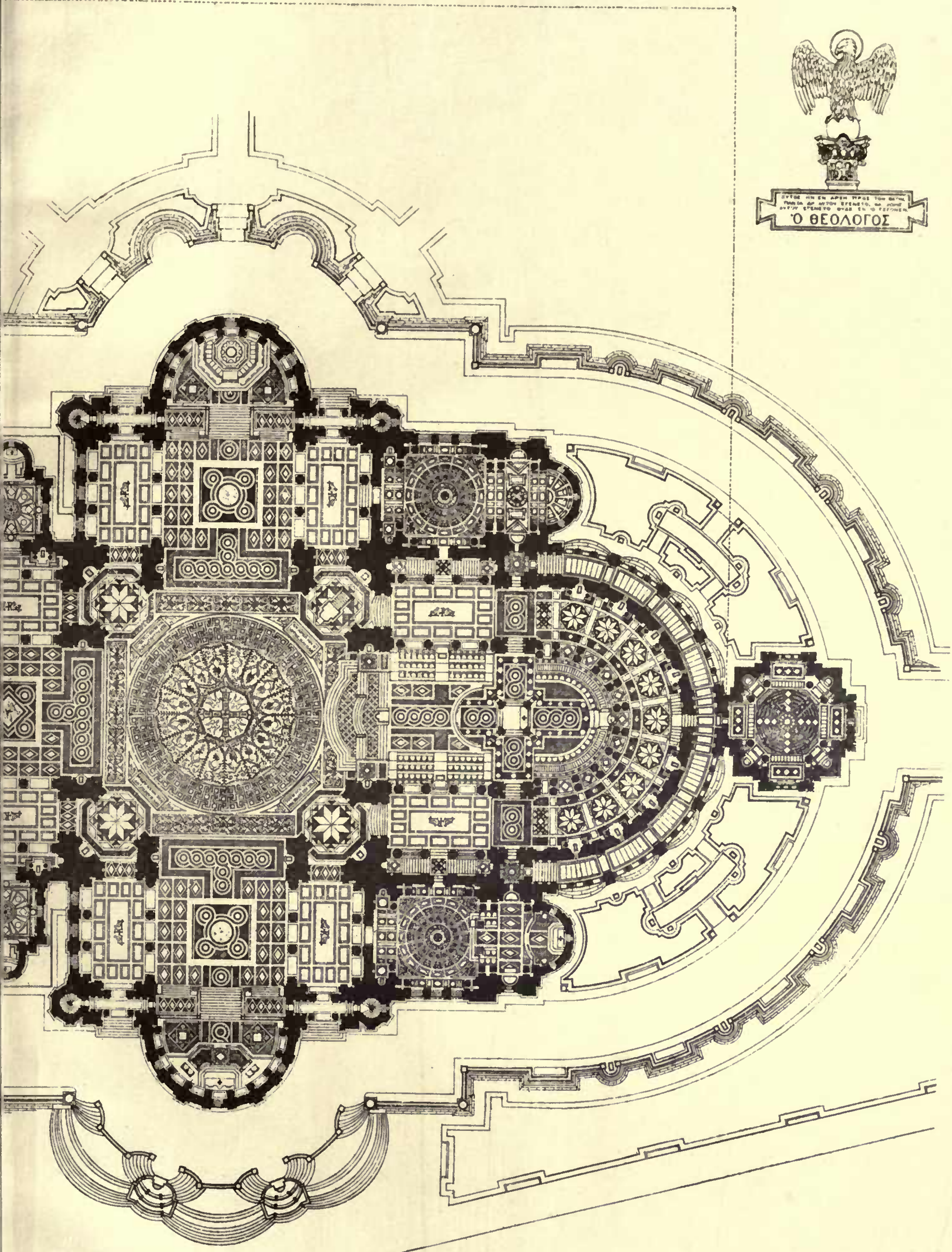


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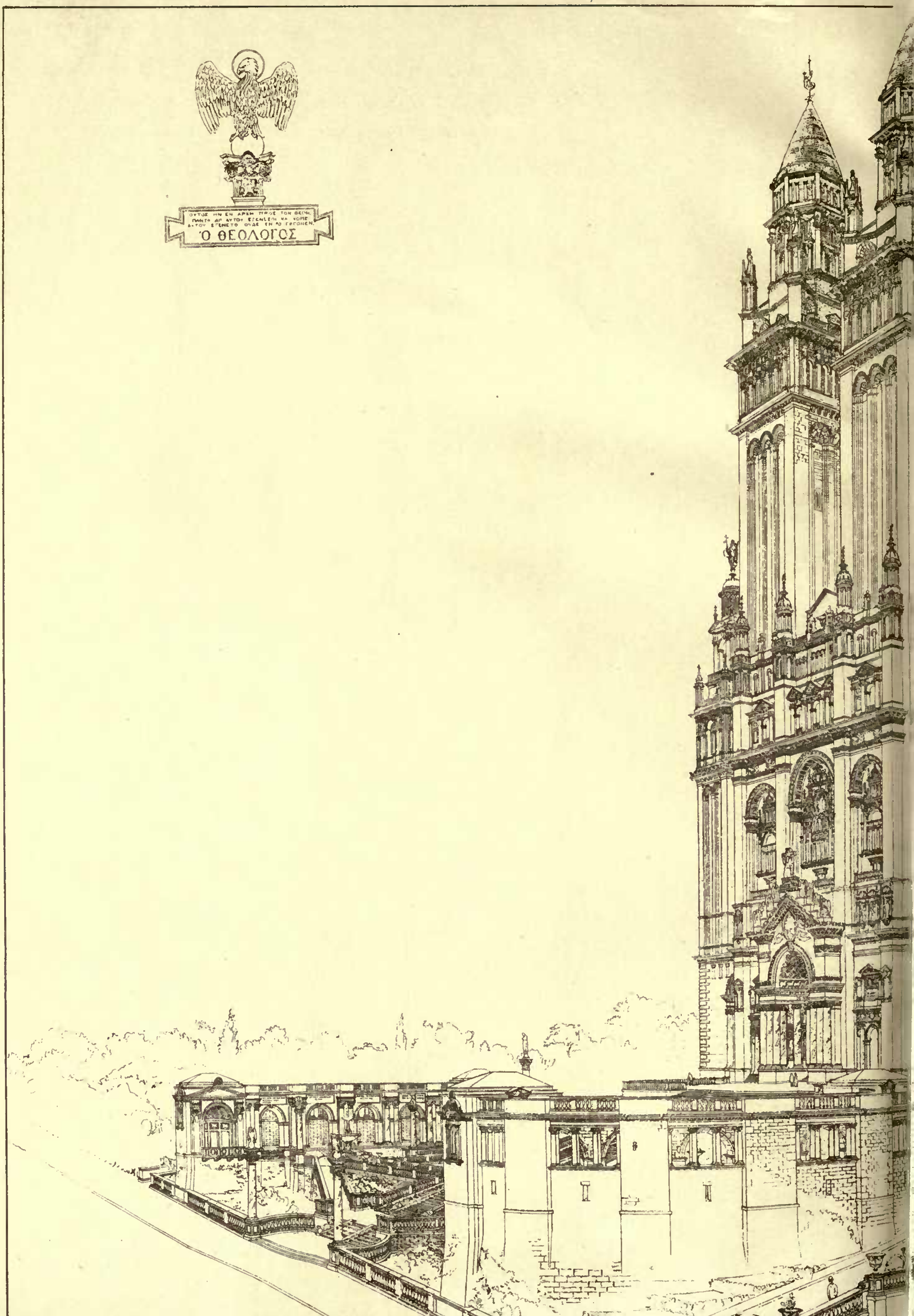


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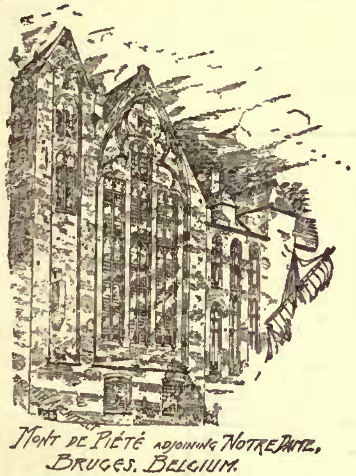
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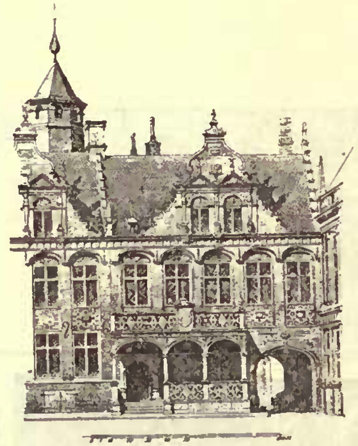
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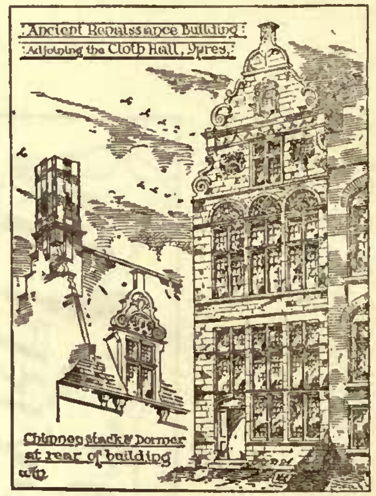
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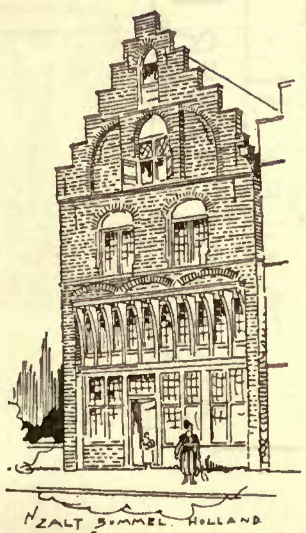
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FLEMISH AND DUTCH BUILDINGS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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OCTOBER 12, 1889.

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TIME passes so rapidly with us that the winner of the *American Architect* Travelling-Scholarship has actually crossed the Atlantic before we have found time to remember that our readers may be interested in knowing how our undertaking resulted. As might be expected, the announcement of our intention to send a travelling student abroad for a year attracted widespread attention, and letters of inquiry were received from almost every State in the country. Although the endeavor to conduct the examinations by mail proved unexpectedly difficult, tedious and in every way unsatisfactory, the examinations were at length brought to a close, with the result that the Scholarship was awarded to Mr. Theodore F. Laist, a young man who was born of German parents in Cincinnati just twenty-one years ago. Mr. Laist's architectural career began in the office of Mr. Charles Crapsey, of that city, where he remained a year and then entered the Massachusetts Institute of Technology. After a year under the instruction of Professor Clark he went to Cornell University and entered the Junior Class of the undergraduate course, and with this class he graduated with the degree of Bachelor of Science in 1888. Since that time he has been at work in the office of Messrs. Mason & Rice, of Detroit. The only professional eminence Mr. Laist has, before this, achieved was his election as President of the Detroit Architectural Sketch-Club, but as he impressed us as a young man of sufficient force of character to profit by the opportunities we have put within his reach, we may hope to hear favorably of his work in after life. In this connection it is well to record that the Travelling-Scholarship of the Boston Museum of Fine Arts was about the same time awarded to Mr. J. C. Martin, an employé in the establishment of the Forbes Lithograph Manufacturing Company, of Boston.

THE meanest outrage in the whole history of trades-unions appears to be that perpetrated last week at the new Union Trust Company's Building in New York. It will be remembered that two years ago the firm of Peck, Martin & Company, dealers in brick and other building materials, happened to offend the magnates of the trades-unions, we believe by inadvertently allowing a non-union man to drive one of their wagons. War to the knife was immediately declared against the unhappy firm. On all buildings for which they supplied any of the materials, work was immediately stopped, by order of the walking-delegates. There are a good many people in New York, however, who like fair play, and these took the part of the excommunicated firm, and declined to break off their contracts with them. Then the unions executed a flank movement, by trying to prevent Peck, Martin & Company from receiving materials from the brick-yards. All the brick manufacturers were notified that they would be "struck" if they delivered any bricks to Peck, Martin & Company; and the bargemen on the river were ordered to refuse to navigate any boat to the wharves occupied by the offenders. After the business of the firm had been completely destroyed, their patience gave out, and they had some of the worst of the walking-delegates brought into court, to answer to a charge of conspiracy. The captives were let off with a merely nominal punishment, but it seems that they have long meditated revenge, of the peculiar trades-union sort, which consists in punishing perfectly innocent people instead of the real offenders, when these happen to be of a sort that it is dangerous to tamper with. In the present case, Mr. David H. King, Jr., being under contract with the Union Trust Company to build a large twelve-story office-building, on very costly land, within a limited time, an excellent opportunity was presented for displaying a conspicuous example of the annoyance and injury which walking-delegates can inflict, when they begin to feel the need of advertising themselves and their power. It happened that Mr. King, like scores of other people, was using some of Peck, Martin & Company's materials, quite forgetful of the feud which every one thought had been settled two years ago, when a lot of walking-delegates came to him, and "objected" to his receiving materials from this particular firm. Mr. King answered, mildly enough, that he had a contract with the firm, from which he could not withdraw, adding, with pacific intent, that he himself employed union men, and did not know of any trouble between Peck, Martin & Company and the unions. This did not satisfy the delegates, who were obviously bent on mischief, and they warned him that if he did not "abandon his contract" with Peck, Martin & Company, "there would be trouble." As "abandoning a contract" is a matter about which the other party to the contract has something to say, and Mr. King had good reason to suppose that he would get himself into "trouble" if he tried to do so without the other party's consent, he neglected to obey the ambassadors, and a day or two later more than three hundred men left the building in a body, at the order of the walking-delegates. The latter, as is their wont, were profuse in apologies and explanations. "They had no complaint," they said, to make against Mr. King, or against the Cornells, who were doing the ironwork in the building, and who, of course, saw their operations brought to a standstill. On the contrary, said the delegates, "they were sorry" that the strike injured people who had given no cause for offence, and they must seek consolation in the reflection that it was not directed at them, but at Peck, Martin & Company, and with this very dubious comfort the parties concerned were, at last accounts, trying to content themselves.

A GREAT deal of talk is going on in Boston about the statue of General Cass, which a patriotic military association had made, and offered to the city, to be placed in the Public Garden. This generous offer was the signal for a storm of protests, and in the discussion a curious story came out. It appeared that the committee of the military association, being under the usual American impression with regard to the manufacture of statues, thought it would be an excellent idea to give the job to a worthy stone-cutter, who did something in angels and the like for graveyards. The stone-cutter, whose honesty and respect for the art with which he held a modest connection deserve to be commemorated, conscious that he could not do justice to his subject, sent the photographs of the deceased General which had been entrusted to him to a professional sculptor of reputation, with the request that he would make him a sketch. The sculptor did so, and the stone-cutter paid him three hundred dollars for his trouble. When the statue was finished, it pleased its military owners so much that they wished to give their fellow-citizens a chance to share their happiness, and decided to offer it to the public authority. Some purist, wishing to see what the new civic decoration was to be

like, visited the stone-yard, and on his return wrote a rather severe criticism of the statue, denouncing, among other things, the carelessness by which an officer was shown in full-dress uniform as to his upper portions, while his legs were concealed by enormous boots, of the pattern of those used by pioneers when digging trenches. The sculptor who designed the figure then formally protested against its display in the Public Garden, on the singular ground that he had supposed it was intended only for a cemetery, and that to put it in a more conspicuous position, for which it was wholly unsuited, would injure his reputation. Other persons presented their views on the subject, and it looks now as if the gift would be refused.

THIS would, it seems to us, be unfortunate. We must confess that we have no sympathy whatever with the persons who wish to have every sort of work of art kept in the background which does not come up to their standard of perfection. Very likely the statue is bad, and it seems unquestionable that it is carelessly studied and ungraceful; but it could not be less graceful than some of the extraordinary figures which lurk about in the bushes in the New York Central Park, and historical accuracy certainly need not be more offended by a general with engineer's boots over his full-dress trousers than by Greenough's Washington, which sits in grim nudity, holding its sword by the blade, in front of the Capitol. The first thing that this country needs to get rid of, in order to advance in the fine arts, is the idea that they are something that only a few initiated persons can comprehend, and that only what they say is good ought to be looked at by the common herd. So long as this idea prevails we shall continue to be enslaved by mannerisms and fashionable artistic hobbies, to the exclusion of true feeling for art, on the part both of artists and the public. In our humble opinion, the best thing that could happen for art in Boston would be to have its Public Garden crowded with all the statues, good, bad and indifferent, that any one chose to present to it. Then, and only then, would the citizens, seeing all the sorts together, and comparing them day after day, by degrees infallibly select the best — not, probably, those which the critics told them were the best — but those which touched most surely and deeply the Boston heart, and in the end the critics, too, would acknowledge that these were the best. Every great national school of art has been formed in this way by the public, not by *dilettanti*, and the American public is as capable as any that ever existed of promoting the development of art by this sort of natural selection, if it could have the objects presented to it in sufficient numbers, and without the intervention of showmen to point out what ought to be admired by well-instructed persons.

M. ROUX, in *L'Architecture*, calls attention to the fact that in France, even under the present laws, the responsibility of architects in matters of construction is judged by rules differing totally from those applied to engineers, whether civil or military. If, as he says, a contractor cheats his employer, or mistakes happen through lack of supervision, the architect is attacked and often made to pay heavily, while engineers, under similar circumstances, are not molested, and he fortifies his conclusions by a number of examples, which he has collected and compared. In 1855, for instance, while the unhappy Gauthier was languishing in jail because he did not happen to catch the contractor for one of his buildings in the act of cheating, the sewer in the Rue de Rivoli, which ran alongside the Tuileries, fell in, immediately upon its completion, for a length of about an eighth of a mile. The sewer was rebuilt at the public expense, and under the supervision of the same engineer who designed the one which fell in. The engineer was not harmed, either in pocket or reputation, by the occurrence, and has since risen to great eminence. In 1876, an immense building, forming the north wing of the barracks at Livran, near Bordeaux, which had been designed and supervised by the military engineers, fell down with a terrible crash, when almost completed, killing a workman and causing an enormous loss; yet no one thought of calling the military engineers to account for the disaster. In 1878, M. Roux finds in a newspaper of the period that "the prefect and the engineer" had visited the bridge of Miramont, which, "from some inexplicable cause," had fallen down immediately after its completion, killing a large number of people. As M. Roux says, it would be interesting to see what would be done to an architect who should have a building collapse on its inmates from what he called "an inexplicable cause."

M. ROUX'S most curious examples, however, are two parallel cases, which occurred in Paris at nearly the same time. About twenty years ago M. Peters, a brewer, built large cellars on the Avenue de Courbevoie, covered, after the French manner, with barrel vaults. In this instance, the cellars being very extensive, the barrel vaults were ranged side by side, the axes being all parallel to each other, and to the line of the street, and communication between the sections being obtained by openings in the walls dividing them. The vaults were below the street grade, and earth was filled in over them. The architect, who was a young but skilful man, the son of an experienced provincial architect, ordered the contractor to fill carefully over the vaults, spreading the material evenly, to avoid unequal pressure. Notwithstanding his remonstrances, the workmen discharged their carts in a body on the side of the vault nearest the street, loading it on one haunch only. The pressure deformed the arch, the crown rose, and the loaded haunch descended, and the vault fell in. As soon as it gave way, the next vault, relieved of the thrust from the first one, which had kept it in position, spread and fell, and, for the same reason, all the others, in succession, collapsed. The owner attacked the architect, on the ground of his joint responsibility with the contractor, and he was condemned to pay thirty thousand dollars damages, and died soon after of grief and despair. Five years later, an engineer, whose name is given, designed a subterranean reservoir, which he arranged to cover with a series of parallel vaults, exactly like the brewery cellar of the preceding case. As soon as the vaults were finished, the contractor began to fill in above them. Exactly as in the preceding case, his men emptied their tip-carts on the edge of the outer vaults, apparently without remonstrance or direction of any kind from the engineer, and, as before, the outer vault changed its shape, collapsed and fell, followed by all the others, over a space of eight or nine thousand square feet, burying five men. The engineer went to look at the ruins, with the chief of police, but found the accident inexplicable. He thought that perhaps the bricks or the workmanship in some particular place might have been defective, and that the fall of a part had induced the collapse of the rest. The cost of repairs was about thirty thousand dollars, which the water-company paid cheerfully, without dreaming of holding anybody to responsibility for the "accident."

THE usual autumnal crop of enthusiastic descriptions of new motors and other inventions is now to be gathered from the daily newspapers. A few days ago, much information was presented in relation to a sort of engine which was to use ammonia-gas instead of steam, and now another specimen of the numerous race of hot-air engines is held up to the admiration of the public. We have no objection to either ammonia or hot-air engines, and those who can use them, and find them economical, should by all means continue to do so, but it will do no harm to remind people who may be tempted to invest money in the development of such inventions that neither of them is new. Ammonia, like ether, carbon bisulphide, and many other substances more volatile than water, has often been used for driving steam-engines, but never yet very satisfactorily, the immense superiority of water to other substances of the kind in capacity for heat appearing to render it the most economical source of elastic vapor yet discovered. As to hot-air engines, so many are in use already that it seems to have been hardly worth while for any one to invent a new one. The Ericsson and Rider pumping-engines are familiar to most architects, and do their work well and economically, and a hot-air elevator engine is still a good deal used, which gives satisfaction, and saves the care and expense of a steam-boiler. The main objection to it consists in the trouble of replacing the packings, which, on account of the high temperature of the air in the cylinders, burn out quickly; but if this could be remedied, which would not appear to be a difficult matter, there seems to be no reason why a hot-air engine could not be devised which would meet, even more satisfactorily than any yet produced, the requirements of the somewhat limited market for such contrivances.

JEAN PAUL AUBÉ.[1] — IV.

THE SCULPTURE ON THE GAMBETTA MONUMENT.



Memorial Fountain · St. Andrews · N. B.
· Robert W. Edis · Archt · · ·

AUBÉ lost no time, after receiving the commission, in beginning work on the figures for the Gambetta monument. His old studio being too small for the purpose, he took another and much larger one on the Rue Lecourbe.

It is doubtful if any memorial ever made in the world has caused so much private and public personal interest, and all centring in the sculpture. It is not strange then that Aubé's studio should become in no little degree a sort of Mecca for the friends of the great republican.

The days during the execution of the work were counted, its progress noted at every step with the liveliest interest, and the date of its final unveiling, when it would appear permanently against the "fair blue sky of France," was looked forward to with impatience and suppressed joy. The sculptor worked with the double interest of artist and man, for Gambetta was one of his best friends and most ardent admirers.

The group on the face of the monument, which is nearly twenty feet high, was modelled one-third of this size, and enlarged when executed in stone. The remainder of the sculpture is in bronze, and was, of course, modelled full-size. The three figures of Force, Truth and Democracy are about thirteen and one-half feet high, as they sit.

The process of making these statues is interesting, as illustrating the character of the sculptor's mind and the limits of methods. It is a facilitating custom, with the large majority of sculptors, to make a carefully measured model in plaster, generally one-third the size of the original work, and then have it enlarged by workmen to its full dimensions in clay. Like most easy ways of attaining an end, its value depends upon the character of the work to be executed, and the kind of artist who makes the first model from which the enlargement is to be made. In the hands of any but a very strong sculptor the method is as dangerous as uncertain. Rude used it with extraordinary exactitude and power, and Fremiet, his favorite pupil, also handles it like a great master. It is most treacherous in connection with the nude, and this was where even so capable a man as Aubé found it useless. He tried it on his first figure for the monument, and it did not work. No measurement, however exact, could produce the desired effect in nude forms. He therefore began his work full-size, continually modelling from life.

The monument was inaugurated July 14, 1888, in presence of Carnot, the President of the Republic, and an immense number of high military and civic dignitaries. The ceremony was of the most imposing and enthusiastic nature. All Paris was there, to admire the tribute paid to the Republican hero, to listen to the firing of guns, the strains of exultant music and the eloquent words uttered by the orators of the day. The Hon. E. Speller, the intimate friend and co-laborer of Gambetta, delivered a brilliant presentation speech, followed by those of the Presidents of the Senate and Chamber of Deputies. The Secretary of State, Floquet, received the monument on the part of the French people, the Government and the unnumbered friends of the dead statesman. If the initiation, progress of execution and final completion of the memorial had been without parallel in the history of monuments, as an expression of love for the dead, the closing ceremonies, which affirmed its existence and started it on its many-centuried journey in the history of art, were equally abounding in enthusiasm and heartfelt attachment.

The principal piece of sculpture on the monument is composed of five figures, the central one of which is a statue of Gambetta represented as pronouncing the words, in his speech of November, 1870: "Frenchmen, let your souls and resolves rise to the height of the perils which fall upon the country. It still depends upon you to show to the whole universe what a great people can do who are determined not to perish." His right arm is extended as though pointing to the frontier, while his left is placed around the neck of a wounded soldier, who, supporting or resting himself upon a cannon, holds a broken sword in his right hand. The latter figure symbolizes an exhausted and half-vanquished army. At the right of Gambetta, and partly behind him, are three other figures. The one at his feet represents an adolescent youth in the garb of a sailor, or of a young farmer, who, in response to the words of the orator, reaches to the ground to pick up a sword; his head is thrown back, and his whole body answers with pride and readiness: it is National Defense preparing for a last effort. Above this figure appears the nervous body of a workman who holds a gun in his hands, and seems exalted at the call made upon his patriotism: he represents the veteran who is ready, in company with the youth, to again go forth in defense of the country. Above Gambetta arises the winged genius of France, who unfurls the flowing folds of a flag which forms a kind of aureole about the head and shoulders of the orator; he comes to inspire the latter in his task of rallying his unfortunate countrymen.

Under this group, on a marble panel set into the die of the monument, are inscribed these words:

TO GAMBETTA,
THE COUNTRY
AND THE REPUBLIC.

On each side of this inscription, seated at the angles of the die, is a naked youth, holding a shield, upon which are marked the interlaced letters R. F. (*Republique Française*). The figures are joined by an immense bronze garland of oak-leaves. On the angles of the rear face of the die are two other youths with their hands clasped, as indicative of concord between Labor and War. Under the cornice of the cap of the shaft, and also on the rear face of the monument, are two charming heads of a boy and girl with their faces very close together, practically kissing each other. Below, is engraved the word Fraternity. On the right side of the die sits the bronze figure of Truth, holding at arm's-length, in her left hand, the symbolic mirror. On the opposite side, also in bronze, is the statue of Force, who rests her right hand upon the ancient fasces, symbolic of Union. On the summit of the monument is placed a great lion with widespreading wings, bearing upon his back the figure of Democracy wearing a Phrygian cap. In her left hand she holds the tables of the Rights of Man, upon which are engraved these words: "Declaration of the rights of the man and the citizen." In her right hand, with arm extended, she grasps the emblem of thunder.

Le Temps, the most serious journal in Paris, while giving a full description of the monument, spoke as follows concerning its merits: "This is not the place for a learned and complete criticism of this work, but we may be permitted, however, to observe that, in the Gambetta group, M. Aubé has known how to marvellously vanquish the difficulties that the statuary encounters in rendering stuffs and draperies. It is also proper to allude to the great conscientiousness that the artist has employed in the preparation of his material and the choice of his models. For instance, the triumphal unfurling of the flag which is carried by the genius of the country, instead of being like those rendered by the most of his colleagues, in cloth, stiff and conventional, M. Aubé has made a flag of real plaits naturally blown out by the wind."

The *Journal Illustré*, in its description, said that the figure of "Truth was an amiable and fine translation of a French woman. The Force is a pure masterpiece — in an attitude of the most heroic tranquility, and as sure of herself as one can imagine the representative of a people who think of revenge without speaking about it." "The heads of the children who are clasping hands are adorable." Of the other figures the same paper observed that they perfectly expressed their several purposes. It has been repeatedly said that the Gambetta group was a reminder of Rude's great bas-relief on the Arch of Triumph. The allusion is correct, in that the sentiment is the same, but Aubé's composition is as original with him as the Marseillaise was with Rude. Rude's is more monumental but Aubé's more human. The first touches a national principle; the second stirs the heart. If the last, by the nature of its subject and material, lacks the great planes of the former, it is warmer in its color, more familiar and human in its composition, and less conventional. It is worthy to be placed with that by Rude as a composition and, after that one, is the most stirring, complete and martial bas-relief of modern times.

The figure of Gambetta is splendid in its ardor, affectionate in its dignity and inspiring without pretension. History in one man. The conception of the whole group is fine, intimate and profoundly artistic. Its art is equalled by its patriotic intelligence. It has the extraordinary significant quality of commemorating the past and inspiring the future. It is the great bugle-note of France to-day. As a piece of sculpture it is most admirable, from a high point-of-view. Its execution in stone was watched by the sculptor with the utmost care, and for a work where intermediate workmen were employed it is a fine success. The pity is that it was not executed in bronze. Less money should have been spent on the pedestal and more given to the sculptor. One sees in this structure an example, especially lamentable in France, of the difficulties that many sculptors have to contend with when working in company with architects. The architectural part of the monument is extremely commonplace, and money expended on such a pile is worse than thrown away. If Aubé had been more fortunate in his professional association the whole structure would have been more harmonious. Besides, no sculpture shows well in that kind of stone until time has blackened it. It is a public loss, as well as a disgrace, that men like Aubé should not have their own way.

The group of Concord, on the rear of the monument, is one of the loveliest in French sculpture. The charm and truth of its idea is Aubé, man and artist. The freshness, sincerity and honesty of its

[1] Continued from No. 717, page 139.

modelling are simply superb. You may enlarge these figures to any dimension, and they will retain their full sentiment and character. So far as the sculpture is concerned, the group of youths on the face of the monument is just as fine, though not quite so happy in idea. There is not a shadow of conventionalism about these figures; they are natural, life-like and handsome enough to be Greek. Their heads are exceptionally fine, a rarity in French sculpture. You seldom see a fine head on a French statue, if it be not a portrait. The whole composition of these four figures shows Aubé to be, what has been well-known for years, one of the very best and truest of French sculptors.

The figures of Truth and Force should be counted amongst the first-class monumental sculpture in the country. Not because they are what is understood as monumental sculpture, pure and simple, but because they are good sculpture. Rude's bas-relief is eminently monumental; Aubé's statues are large, human and beautiful. They are living, breathing women — handsome enough to be goddesses. In this kind of sculpture they have no superior in all French art. They are quite as strong as Carpeaux's work but more refined, more closely studied. The "Force" is a grand statue, feminine and graceful. The "Truth" is a fine, delicate and elegant representation of the subject. Her modesty is exquisite. It is a perfect example of a suggested subject. The conception of both of these figures indicate a high grade of art-temperament. High in its origin, and high in its continual and undeviating progress, easy and refined in its expression. The modelling is thoroughly genuine, fresh, honest and life-like. In modelling, as in type and character, each figure is kept firmly and unpretentiously with its own individuality. If the "Force" is firm, the "Truth" is tender. They do honor to French art.

The opportunity for a great decorative group on the summit of the monument was extremely fortunate, and it has been grandly met. The only other one that approaches it was that offered on the Column of July, but this one being nearer the eye gave a wider scope to the artist. It is an extremely successful symbolic group, happy in its conception, composed with mastery, and carried out as it deserved to be. The young Republic sits as gracefully and proudly as an angel upon the back of the lion. It is a superb example of architectural sculpture, a splendid epitome of French Republican sentiment. Here, again, one thinks of Carpeaux, but he has met his peer in Aubé. Rodin is more intense, Fremiet more distinguished, but for a complete expression of good, healthy sculpture, that on this monument must be accorded a place amongst the very best, since the Greek.

From any art point-of-view this sculpture is to be considered only as sculpture, because the character of the architecture is such that the former has no real artistic relation with the latter. This fact is no fault of the sculptor's. No sculptor, however great, could have found a proper relationship for his figures with such an architectural structure. Justly speaking, the work of Aubé is the monument. It realizes two great facts, in any country's art, the existence of such a temperament as that possessed by Aubé, and its expression to such a full extent. It marks a decided date in French sculpture, a date of which the whole nation ought to be proud. There are no female figures in French sculpture, with which the writer is familiar, that are at the same time so colossal and womanly, in fact exquisite in conception and beautiful in their rendering. They are the production of one of the very best balanced, fullest and healthiest sculptors of modern times. They establish with unquestioned authority the point-of-view from which they are to be judged, and they are so well done that they leave no vantage ground for the critic. They absolve themselves from comparison with any other sculpture, and oblige an individual judgment. They may rise and walk with the rest of the world, as human beings, flesh and blood and bones. So far they are Greek; other than that they are French in a large way.

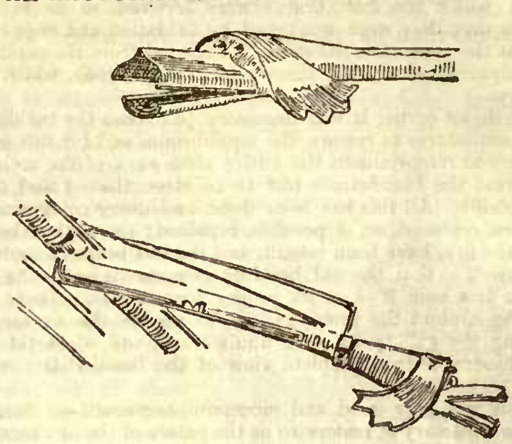
Aubé has known how, in the Gambetta group, to interpret and continue to futurity, the affectionate relationship that existed between French Republicans and their great leader. This group follows and confirms the Marseillaise with astonishing appropriateness and progressive historical authority.

As a fitting recognition of his merits the sculptor received the decoration of the Legion of Honor the day after the inauguration of the monument. T. H. Bartlett.

[To be continued.]

A Novel Electric Railway.—An electric railway is now running in England on the southern coast, in which the supply system is quite different from any electric railroad in this country. About a foot and a half from the car on the side of the track a flat rail runs, this rail being raised on posts of a foot in height, the current travelling on this rail being connected with the car mechanism by a rod containing a wire. A peculiar part of the system is in the crossing of streets, the rail ceasing abruptly on one side of the road, and the car propelled by its momentum plying across the road, where the connecting rod catches on to the rail once more. A wire passes under the road from one end of the raised rail to the other side of the road and joins the current. These cars often travel at the rate of twenty miles per hour. The electricity used is generated by a water-wheel at one end of the route. — *Providence Journal.*

THE RESTORATIONS OF THE DUCAL PALACE, VENICE.



It is announced that the restorations of the Ducal Palace in Venice are completed, and that the glorious building will be thrown open to sight in November at the latest, freed from the hoarding and balks of timber which have hidden one or other part of it for about twenty years. A correspondent of the London *Times* says: "The work done on it is one of the most formidable of modern restorations, and the manner in which it has been carried out merits the highest praise that can be given to a work of its kind. Saving extraordinary accidents, it will stand in good condition as long as it has stood, for every avoidable element of decay has been eliminated from the construction.

"To appreciate what has been done, it is necessary to know the weaknesses of construction in the old building, due to the carelessness or ignorance of the early builders, or to the lack of those mechanical appliances which modern art has developed. The original condition of the site was far more favorable for solidity than that of St. Mark's, being on a ridge of comparatively solid land, but the first building, of the eighth century, of which nothing is now visible externally, was evidently a modest brick castle with at least two towers, one at the corner next the Ponte di Paglia (in which the Emperor Otho was lodged), and the other where the triple column in the superior arcade of the western or Piazzetta façade breaks the uniformity of the structure. When, later, it was decided to construct a more splendid building, the Riva façade seems to have been alone originally planned for, and this triple column was intended to mark the extent of the plan. The exterior of the old building was pulled down and the new laid on the old foundations, and at the southeast angle certainly without strengthening the foundations, intended for a much lighter building. The interior work of this tower is still visible, showing how the later structure was grafted on the earlier.

"The consequence of the piling of the enormous weight of the present mass on the slight foundation was that the foundation sank to such an extent that the superstructure on the angle was thrown forward to the distance of twenty-eight centimetres, and, but for shoring, must finally have sent the angle into the canal. The columns of the lower colonnade at the angles southeast and southwest were braced by iron bars which ran through the capitals so as to add the strength of the whole to the corner column which bore the direct push. These bars, increasing in size by the oxidation, split the capitals without a single exception, thus weakening the building rather than strengthening it. Where the columns rested on the stylobate the bed was prepared for equalizing the pressure by pouring lead between.

"But this was never equally distributed and the pressure was not equalized, the consequence of which was that the columns sometimes split, and, as the capitals were similarly arranged and took more directly the pressure, they oftener split, and in some cases were crushed into many pieces — the corner column on the southwest into thirty or forty fragments. On the second-story colonnade the capitals were tied in a similar manner, but through the entire extent of the colonnade, and every capital was split, and in some cases fractured badly. Then came the fire of 1577, which ruined the angle of the Ponte di Paglia especially, and when the building had escaped the Renaissance restorers, and the commission of architects decided to restore it as much as possible to its original condition, the five arches at that angle were walled up solidly. This prevented any further deterioration on that side, but the southwest angle, that of the Adam and Eve group, was so weakened that, but for the shoring up, it had fallen into the Piazzetta.

"To remedy all these defects and release the building from the disfigurements of the balks of timber which alone prevented it from falling into the Grand Canal or Piazzetta, it was necessary to remove every column of both galleries and replace every defective stone. The arches were filled up with solid masses of timber, then wedged up till the column and capital were liberated; and this being done by sections, the columns, where found fatally injured, were replaced by new ones, the capitals in the same state were copied, the stones of the arches subjected to the same scrutiny and renewal, and the bed was prepared by the interplacing of a sheet of lead, which, yielding to the pressure, adapted itself to the inequalities of the surfaces and gave an equal bearing. The iron braces were replaced by a system consisting of bronze sockets, let into the foot-stones of

the arch, into which the iron braces were screwed, so as to be removable if in time they were weakened by oxidation and required renewal, and at the same time the strain is removed from the capital, which is a sculptured stone, and thrown on the footstone, which is simple masonry.

"On the southeast corner it was necessary to extend the building twenty-eight centimetres to restore the equilibrium, and for this end it was necessary to renew almost the entire stonework of the arches and entablatures; the foundations had to be strengthened and the whole angle rebuilt. All this has been done, and every column and capital has been replaced, or, if possible, repaired; the walls, where weakened by the fire, have been rebuilt, and the last brace of timber has been removed, so that the old building now stands as no one of this generation has seen it — on its proper foundations. There is still a hoarding around the lower gallery, to enable the workmen who are paving the gallery to work undisturbed, and when this is done the last hindrance to a complete view of the Ducal Palace will be removed.

"But all this was only good and successful engineering. Something more was necessary to restore to us the palace of the fourteenth century. This, too, has been done. The broken capitals, where beyond mending and service, were cemented together and copied with the most absolute exactitude, the great capitals requiring the work of a competent sculptor two years. Where repairs were possible the pieces were brought together and cemented, and bronze rings were shrunk into circular grooves in the upper and lower surfaces of the stone, being first cushioned with lead; the fragments of the ornamentation replaced if existing, and if not by new work, cemented and held by bronze clamps, and so perfectly imitated that very few people who will walk along the colonnade on the Piazzetta will be able to tell which of the capitals are the new and which are the old. I cannot. The stains, the marks of time and weather, have been so perfectly imitated on the new stone that the closest scrutiny is necessary to see what is weather-worn and what is artificially treated.

"There still remains an important change to be made to render the building what it was in the days of the prime of the republic. This is the removal of the partition in the upper gallery, put in only a century or so ago to utilize the space for offices, etc., and now occupied by the library. The Ministry of Public Instruction proposes to remove the library to the Procuratie on the opposite side of the Piazzetta and to throw these rooms open, so that the gallery will be as it originally was, a double gallery. The Ministry of Public Works insists on letting the Procuratie rooms, of which it has the control, for club or commercial purposes, and, as they are the only rooms on the Piazza appropriate for the library, this would compel the keeping of the books where they now are, to the detriment of both library and palace. It is to be hoped that the archæological authorities will prevail over the commercial, for the palace is a national monument of such importance that no motive ought to be allowed to interfere with its perfect restoration and liberty. There is still a family allowed to inhabit the rooms of the palace, to the evident danger of fire, though the orders were given years ago to have all domesticity abolished from its precincts. The new heating arrangements are placed in the basement, and seem to be such as to absolutely exclude any danger of conflagration, the furnaces being surrounded by water, and the heating being done by hot water alone."

LONDON'S WATER-SUPPLY.



BISHOP'S·THRONE·, AMER·CN·PARIS·

WATER is supplied to the millions of London by seven companies, which, for the greater part, draw directly from the Thames in the neighborhood of Hampton. The daily delivery is 150,000,000 gallons. This water is purified by more than 100 filter-beds, varying in size from three-quarters of an acre to over an acre and a half in area. The immense amount of land, capital and labor invested in this work of purification may be understood by noting the following facts relating to the plant of the Southwark & Vauxhall Water Company, one of the seven to which reference is made. These works are located on the Surrey side of the Thames, below Lambeth Palace, the residence of the Archbishop of Canterbury.

They occupy sixty acres of ground in this crowded part of London, which, at its estimated value of $50,000 per acre, means an investment of $3,000,000 for the land alone. The water is pumped up 140 feet at the Hampton intake, and thence runs fifteen miles through a three-foot iron pipe before reaching the filtering-plant at London. The filtered water is again lifted, by Cornish engines, into a stand-pipe 200 feet high, and is thence delivered locally. The water is received from the Hampton conduit pipe into two reservoirs, one holding 18,000,000 and the other 28,000,000 gallons, and is from them admitted to the filter-beds, which are nine in number.

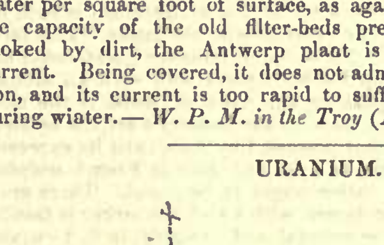
Each filter-bed is in reality a large reservoir with solid masonry walls, containing at the bottom conduits built with open joints for collecting the filtered water. The filtering material (beginning at the bottom) is broken stone of gradually-increasing fineness, then gravel, and finally sand. Such a filter may be seen at Hudson, N. Y., and also at Poughkeepsie, but the English build their filters upon a more substantial basis, and also use finer sand than those above referred to. The depth of water allowed on the filter is four feet. The maximum delivery ever obtained from these nine filters was 125,000,000 gallons in seven days, or thirty-six gallons per day per square foot of surface. An English engineer usually estimates that a filter-bed in good working order should deliver somewhat more than twice this amount.

To clean these nine beds a force of twenty-five men is required, one bed being no sooner cleaned than the men set to work upon the next. These laborers receive about ninety-five cents per day, and the average cost for cleaning is about $30 per bed. The rapidity with which the surface of the bed becomes clogged depends principally upon the season of the year. The greatest difficulty is experienced from March to July, when the upper layer of sand becomes covered with fish-spawn, which quickly arrests filtration and renders it necessary to remove the water from the top of the filter by pumping before the obstructing spawn can be removed with rake and hoe. The loss of time and labor from this cause is a serious item.

From July until October, another difficulty, scarcely less serious, is the growth of vegetation, which begins upon the bottom. This, in like manner, requires removal at short intervals. Even the comparatively mild English winters occasionally give trouble — notably that of 1884, when seventy men were constantly employed removing ice. Despite all these difficulties and at this enormous expense, public sentiment in England so strongly demands a clear, bright and wholesome water that the practice of filtration is becoming general throughout the kingdom. Even in the case of Liverpool, which is bringing its new supply from Vyrnwy Lake, fifty miles away in the Welsh mountains, filter-beds are to be used.

It is odd, in view of the superb results obtained in the purification of the supply of the city of Antwerp, that the expensive open filter-bed should ever again be constructed. The new Antwerp plant is based upon an American patent, and is delivering 3,200 gallons of water per square foot of surface, as against eighty feet, which was the capacity of the old filter-beds previously employed. When choked by dirt, the Antwerp plant is cleaned by reversing the current. Being covered, it does not admit of the growth of vegetation, and its current is too rapid to suffer from the danger of ice during winter.— *W. P. M. in the Troy (N. Y.) Times.*

URANIUM.



CADIZ. CATHEDRAL. SPAIN
Don Vicente Acero & Don Juan de la Vega Archts

THE discovery in Cornwall of a continuous vein of uranium is an event of more importance to the fortunate finders than to the world at large. For, though not without its uses, this once rare metal is not indispensable in the arts. What might have happened had it originally been cheap enough for the purposes of the great industries, it is difficult to say. But for a century it has occurred so seldom, and then only in pockets or patches, that the current price has been something like twenty-four hundred pounds per ton. It will be understood, then, that although a good deal cheaper than either gold or silver, uranium is still valuable enough to render the ownership of a "true fissure vein" a position to be regarded with something like envy even by a reef-miner in Grass Valley, or by the millionaire who measures his wealth by "feet" on the Comstock Lode. In appearance, uranium is of a steel-white color, and hitherto it has been extracted very sparingly from various ores. Of these, the only one which is practically available as a raw material is pitch-blende, the "Uranpecherz"

of the German miners. This mineral is found, associated with lead and silver ores, in various parts of the world, especially in Bohemia, Saxony, and Hungary, in Connecticut, and in the Tincroft and Tol Carne Mines of Redruth, in Cornwall, where it occurs in the shape of greenish or brown-black masses clustering together like grapes. This pitch-blende is, however, almost invariably associated with a host of sulphides, arsenides, and other foreign metallic compounds, so that its extraction is necessarily a troublesome and expensive process. It is, therefore, curious that just one hundred years after Klaproth succeeded in isolating it under a name suggested by the newly-discovered planet Uranus, a lode of unprecedented promise should have been discovered at the Union Mine, Grampound-road, Cornwall. Here the ore, instead of being scattered in "pockets," fills a vein of more or less uniform breadth throughout the "country rock." How continuous it may be it is impossible to predict. But already the prospects are so good that several tons of ore have been banked, the assays reading as high as twelve per cent of the pure metal, and, in some specimens, running up to thirty per cent. It is true that in Bohemia very rich samples have been known to yield eighty per cent, but this was in exceptional cases and in minute quantities, and should the new Cornish lode not run out, the fresh supplies may enable metallurgists to follow up some interesting experiments, which have previously been hampered, not so much by the cost as by the comparative scarcity of the metal.

The various oxides of uranium have long been employed in the arts, more particularly in porcelain painting. Thus, uranic oxide imparts a beautiful golden or greenish yellow hue to glass, while uranous oxide is used in producing the highly-valued black porcelain. In photography, various uranium compounds are in demand as substitutes for the still more costly chloride of gold, and as it forms with platinum and copper two alloys, each having the appearance of the most precious of all the metals, and, in one instance at least, capable of resisting the action of acids, it has been tried with perfect success as a cheap substitute for gold in electro-plating. Finally — and perhaps still more important — as uranium offers a high electrical resistance, it will, doubtless, when available in sufficient quantities, be eagerly seized upon as a useful aid in the electrician's work. Altogether, the discovery made in Cornwall cannot fail to lead to many suggestive experiments and applications. It may also show that the experience of the past is not to be accepted as an infallible criterion of what the future has in store, and that other metals, hitherto regarded as little more than metallurgical curiosities, may in time turn up in quantities suitable for industrial purposes. Take, for example, the metals of the platinum group. Were they found in sufficient abundance, there is little doubt that many of these would be employed in a score of ways, for which their costliness renders them at present inapplicable. The market price of platinum itself ranges from four to eight times that of silver, and of late years the value has been rapidly rising, owing to the increasing demand for platinum vessels, the majority of which are manufactured in England, though the supplies of metal come, for the most part, from Russia. Palladium is still more costly, and owing to its combined hardness and ductility it is in large demand by dentists. It is also used for making the graduated levels of theodolites and other instruments, because, unlike silver, it remains bright in sulphuretted hydrogen. Osmium is not only the heaviest of all known bodies, but the most infusible. However, as it forms a fine alloy with tin, these drawbacks would soon be overcome were the raw material a little more frequent in nature. Osmiridium is harder still. Hence the larger grains are utilized for making the "diamond points" of gold pens, and were it easy to unite the native dust into large masses, the metal, being rather more common than most other members of its group, would lend itself to endless other applications. How far this has been accomplished remains to be proved, though, if we are to credit some recent statements, an American pen-maker has solved the problem by producing a phosphorized osmiridium which can be cast, and pressed, while liquid, "into thin continuous slabs even harder than the native substance, and susceptible of being wrought into drills, knife-edges" and other implements. It may be remembered that the alloy used in the construction of the International geodetic standard was prepared by fusing platinum and iridium together. The result was a metal all but indestructible, extremely dense and rigid, and, naturally, capable of taking a brilliant polish.

These examples may serve as types of many others. For though iron, copper, lead, gold and silver are so extensively used, that is not due to anything in themselves which renders these elements preferable to others known to the chemist. On the contrary, several of them are employed mainly because they are of frequent occurrence, and were any of those rarer metals which we have mentioned to be discovered in as large a quantity, and as easily worked, they might at once replace their older rivals. Gold and silver are, indeed, among the least useful of all known metals, and even in beauty there are others which will favorably compare with them. But they have been so long known, and have so entered into every phase of human life, that their applications are far more numerous than those of any other substance of the same limited occurrence. Moreover, as all races, from time immemorial, have accepted them as the standards of value, they — for a very long time, at least — managed to maintain their price very steadily from year to year. The fall in the value of silver, consequent, amongst other things, on its demonetization in certain countries, has, however, proved that this rate of exchange is purely artificial. Were gold treated with equal contumely, a similar result would no doubt follow. At the same time, it is idle hinting at even a serious proposal of the kind. For, unless the whole of the civilized nations unanimously agreed to impoverish themselves by demonetizing their gold, the fluctuations in value of any possible substitute would be so great that the object aimed at must necessarily be defeated. Nevertheless, it cannot be denied that, from a theoretical point-of-view, gold and silver are among the most wasteful of all metals for monetary purposes. They are too soft to wear well, and hence great loss is constantly being incurred by "sweating," either artificially or accidentally in the course of ordinary transfer from hand to hand. Moreover, being in request as materials for jewelry and for articles of use, immense quantities of these precious metals are continually being absorbed, instead of being applied to the manufacture of currency. A harder metal would be better. This is unquestionably to be found in platinum and its allies. For they do not lend themselves to the jeweller's purposes, and they are all but indestructible. The Russians were so convinced of this that they actually struck platinum coins. But — and their experience shows the difficulty of taking any fresh departure of the kind — they were forced to abandon the practice, owing to the constant fluctuation in the market rate of the metal. When it was cheap the pieces were refused. On the other hand, when platinum rose in price, the roubles were hoarded, or went promptly into the melting-pot. — *The Spectator.*

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF FREDERICK A. BROWN, ESQ., ASHEVILLE, N. C. MR. HENRY RUTGERS MARSHALL, ARCHITECT, NEW YORK, N. Y.

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THE SCULPTURE ON THE GAMBETTA MONUMENT, PARIS, FRANCE. J. P. AUBÉ, SCULPTOR.

SEE article elsewhere in this issue.

THE TOMBS OF AYMER DE VALENCE AND EDMUND CROUCHBACK IN WESTMINSTER ABBEY, LONDON, ENGLAND. AFTER AN ETCHING BY MR. AXEL HAIG.

SEE article on "Equestrian Monuments," elsewhere in this issue.

THE TOMB OF KING LADISLAUS, NAPLES, ITALY.

SEE article on "Equestrian Monuments," elsewhere in this issue.

THE MONUMENT TO THE DUKE OF WELLINGTON IN ST. PAUL'S, LONDON, ENGLAND.

THIS illustration is reproduced from the *London Illustrated News* in connection with the article on "Equestrian Monuments," elsewhere in this issue.

TOMB OF THE DUC DE BRÉZÉ IN THE CATHEDRAL, ROUEN, FRANCE.

SEE article on "Equestrian Monuments," elsewhere in this issue.

THE GRANT MONUMENT COMPETITION.

THE secretary of the Grant Monument Association desires us to state that the recent publication of certain designs by the *New York World* and *Harper's Weekly* as those premiated by the experts, was entirely unauthorized and done against the protest of the committee. He says the report of the Expert Board is still before the committee, and has not yet been definitively acted upon.

SUN-DIAL MOTTOES. — Nor has other rollicking fun and free play of lighter merriment been altogether chastised out of the sun-dial. Evidence of that is got in the supposed Welsh inscription to the sun, or to man, deciphered in Dean Cotton's garden at Bangor: "Goa bou tyo urb us in ess," the interpretation of which can be learned in the wholesome mirth attending the origin of another motto. When one was wanted for Inner Temple Terrace dial, and the artist went by arrangement to hear what was fixed upon, a testy old gentleman, to whom the question was put, cried: "Begone about your business!" The artist took that as his answer, and painted the words. They were approved by the Benchers, and have been repeated on a dial at High Lane, Cheshire, on the gable of a cottage between Stockport and New Mills, at the Church of Bury St. Edmunds, and at Chesterton Church, Warwickshire. — *The Gentleman's Magazine.*

EQUESTRIAN MONUMENTS.[1] — XXI.

DUAL EFFIGIES.



Apollo: Decoration by Lamaire in the Palais d' Elysee, Paris. From the *Revue des Arts decoratifs.*

It may be remembered that, in describing the monuments to the Scaligers at Verona and the Duke of Brunswick at Geneva, attention was drawn to the fact that mortuary honor was done to the individual to whom the monument was erected by immortalizing him in two effigies: one the calm, jacent figure, with placid face and folded hands, resting upon the lid of the sarcophagus, the stereotyped reminder of the grim, mouldering frame, similarly posed, that lay within the sculptured sepulchre just below; the other an equestrian figure representing the departed great one in the full bloom of vigorous manhood. This affluence of portraiture is not a common feature of monuments or tombs, and there are not many cases where a recumbent figure has as a foil an equestrian figure above it; yet there are several, and these monuments rank amongst the most notable in the world.

There is one such monument where the subject, in this case a kingly subject, is represented in sculpture not twice, but four times. It is in the Church of S. Giovanni à Carbonara at Naples that this remarkable structure is to be found, and it is an interesting example of the transitional period which the gilding and brilliant coloring of a Southern Italian Catholic church neither mars nor adorns. The tomb of Ladislaus, King of Naples, is, perhaps, the most elaborately be-sculptured tomb in existence, and is, indeed, a notable monument for a sister to erect to a brother's memory. The sarcophagus, with its superposed figure sheltered behind half-drawn curtains, after the Veronese manner, occupies the middle of the composition. Beneath it, in the central opening of the arcade, are the seated figures of the King and his mother, supported on either hand by similar seated figures of Royalty, Faith, Hope and Charity. This arcade is supported in its turn by large caryatid figures of Temperance, Prudence, Justice and Fortitude, between the middle pair of which is the doorway leading from the choir to the sacristy. The niches are filled with statuettes of saints, fathers of the church and emblematic figures, while there is a profusion of other sculpture wherever opportunity offers. The whole composition is crowned with an equestrian figure of the King, somewhat less than life-size, the horse disguised beneath a horse-cloth, and the man waving an uplifted sword in token of a successful and warlike career, though a short one. The King is represented a fourth time as one member of a bas-relief group at the back of the niche in which the sarcophagus rests, which seemingly is watching over the sleeping figure, though it may, perhaps, symbolize the resurrection.

The monument is the work of Andrea Ciccione, who was assisted by Scilla, a Milanese sculptor.

In Westminster Abbey, grouped together, are two tombs, more modest and vastly more pleasing than this elaborate Neapolitan mausoleum, upon which also color was originally used, but where it takes an antiquary's skill now to find a trace of it. The equestrian sculpture which here entitles these tombs to a place amongst double-effigied monuments consists, in the case of the tomb of Aymer de Valence, as well as in that of Edmund Crouchback, Earl of Lancaster, merely of little bas-reliefs in the quatrefoils which ornament the heads of the canopy gables. Both of these tombs have been much injured, probably during the preparations for one or another of the coronations that have taken place since they were set up, and parts of these little bas-reliefs have shared the fate of more salient bits of carving. The tomb of De Valence fell into such disrepair that it came near being displaced in favor of the great monument to General Wolfe. Fortunately, Horace Walpole's protest — a disinterested one, since he intended, if his appeal were disregarded, to make it an added attraction to the grounds at Strawberry Hill — was heeded and, instead of being destroyed, it was restored.

Crouchback's monument, however, still waits the repairer's care. This monument might have been included amongst the Crusaders' monuments, though historians are uncertain whether the crossing of his feet and the cross on his cloak mean that he really accompanied his brother Edward when, as Prince of Wales, he crusaded against the Saracen; or whether, after the fashion of the day, he obtained from the Pope the right to wear the cross without actual service in return for a payment in coin of the realm.

[1] Continued from page 135, No. 717.

The introduction of the horse in sepulchral sculpture has not only the warrant of a high descent from the pagan myths of antiquity, but is also directly connected with the sacred fabric through a



Sir Richard Stapleton. Exeter Cathedral.

mediæval custom which benefited the churchmen themselves, the temporary guardians of the structure. In those times it was in some places the custom that, when a knight died, his horse was led behind the bier to the grave, and then not slaughtered there as a sacrifice to the gods, as would have been the case in still earlier days, but, instead, turned over to the monks or priests for their use and profit, and so became the property of the church. It may be this custom that allowed the introduction on the tomb of Sir Richard Stapleton, in Exeter Cathedral, of the forepart of a horse led by attendant figures, which is placed at the feet of the recumbent Sir Richard. Or, as the knight's head is raised on three pillows just enough for his eyes to rest upon the horse's head, it may be that there is some forgotten tale of service rendered by beast to man which made the master unwilling to lose sight of his faithful servant even in death.

Many of the horses represented in equestrian sculpture must be portraits of actual animals, and so associated by history or legend with the rider, and some of them would doubtless be curious and amusing if they could be known. The Rev. R. H. Barham, the writer of the "*Ingoldsby Legends*," at any rate, has made an interesting story out of the legend that accounts for the placing on the tomb of Sir Robert de Shurland, in the Minster Church in the Isle of Sheppey, in Kent, of a piece of equine sculpture similar to that which fronts the loving gaze of Sir Richard Stapleton. It seems that one day, in a fit of rage, Sir Robert de Shurland caused a priest to be buried alive. For this he was not allowed to suffer the pangs of slow-growing remorse after the good old fashion of retributive justice, for the churchmen were powerful enough to press the matter to an issue somewhat more speedily than a callous conscience would allow it to be brought about, and, in consequence, Sir Robert found that he was in a very unpleasant position, and in immediate peril of falling into the hands of the officers of the law. Just at this juncture he heard that the king was aboard a ship then lying at the Great Nore, off the Isle of Sheppey, and he felt that could he but obtain an audience, he could so state his case as to obtain the royal pardon and safe-guard. No time was to be lost, and as there was either no boat at hand, or else no boatman or no breeze to fill her sails, he was in a quandary how to reach the king, until at last his eye fell upon his horse, and he at once conceived that in him lay his only chance of pleading his case that day. Mounting, he rode his horse into the water and then forced him to swim out to the ship and on reaching it, while still on his generous-spirited beast's back, prayed the king's pardon for having performed the rite of burial before nature had provided a corpse. The king, moved by the ingenuity of the plea, or influenced by admiration of the daring of the man and courage of the horse, granted his prayer, and Grey Dolphin carried his lighter-hearted master safely to shore again. As they emerged from the sea they were met by a witch, who sneeringly declared that, though the horse had saved his rider's neck this time, he would yet cause his master's death. His exultation chilled to sudden dread, Sir Robert showed how heartless a villain he was, for, with the quick impulse of selfishness, he decided to give fate no chances, and, dismounting, slew his gallant horse before he had recovered his breath after his great feat. Years after, Sir Robert, as he strolled with a companion on the beach, came upon the horse's skeleton, just uncovered by a shifting of the sand, and, naturally, at once fell to telling how cleverly he had made the witch's prediction futile. As he finished the tale, he gave the horse's skull so hearty a kick that a splinter of bone entered his foot, and shortly after blood-poisoning brought about the fulfilment of the prophecy.

If we may suppose that Sir Richard Stapleton is gazing lovingly upon a favorite horse, we may also suppose that a churchman's malice sought to join an added terror to Sir Robert's torments by setting Gray Dolphin's head on his monument.

Legends of a gentler nature surround the beautiful tomb of the Duc de Brézé in the Chapel of the Virgin in the Cathedral at Rouen. Those who would curiously inquire into the social life of the times of the Italian and French Renaissance would find a very vivid picture set before them in the autobiography of that prince of scoundrels, but most cunning master of his art, Benvenuto Cellini. In these pages will be found a description of the many things which Henri II commissioned him to execute for the pleasuring of his mistress, the beautiful Diana of Poitiers, Duchess of Valentinois, who, though twenty years her royal lover's senior in age, yet so preserved her beauty and exercised her great intelligence and wit, that she held at sixty years of age as much influence over him as when in the full-bloom of beauty she yielded to his advances more than a score of years before. Henri, as Dauphin, sought her as a toy, but he found that he had won more than that, and in place of a mere distraction for the moment, he soon discovered he had secured a friend and adviser, who was later held to be worthy of a seat at his council board, and her advice, sometimes judicious and sometimes ill-considered, was more certain of being followed than that given by the other members.

How far one is justified in feeling that a woman who has once lapsed from virtue must always have been giddy is questionable, but the tendency generally is to deprive the woman of the benefit of the doubt, and the fact that Diana attracted the attention of the woman-loving Francis I at the time she successfully pleaded before him for her father's life is, perhaps, a reason for suspecting that her subsequent marriage to Louis de Brézé, a man forty years her senior, may have been one of those cases where a king rewarded a courtier and provided for a discarded fair one at one and the same time. Her life as the wife of De Brézé was blameless, so far as known, and feeling, perhaps, that her career was run she ostensibly prepared to spend the remainder of her life as a widow mourning faithfully her departed spouse. At any rate, this was her intention as declared in the inscription that overhangs the sarcophagus of Louis de Brézé, Count of Maulevrier:

"Hoc, Lodoice, tibi posuit Brezœe sepulchrum
"Pictonis amisso mœsta Diana viro,
"Indivulsa tibi quoudam et fidissima conjux
"Ut fuit in thalamo, sic erit iu tumulo."

It was at that time her intention, perhaps it was really her hope, that her ashes should mingle with those of her spouse placed beneath this glorious monument, but she reckoned without the ardor of a gallant young prince, and the duty which she, as a properly-bred subject, must render on demand. Her mourning did not last many years: hardly long enough to see finished the monument which was under construction from 1535 to 1544.

The monument is the work either of Jean Goujon or Jean Cousin, or possibly of both. Authorities seem to incline to the belief that it was Cousin who did all or the main portion of the work. It is one of the small class where the sculptor has, generally following the instructions of his patron, done nothing to disguise the disagreeable side of bodily dissolution. The recumbent effigy of De Brézé shows, not the stereotyped figure decently draped, with features settled into the calm of death, but the sternly realistic form of an aged man, emaciated by sickness, lying half-naked on his couch, and with one hand feebly clutching at his breast as he draws his last breath, the outlines of his lower limbs revealing themselves beneath the disarranged sheet, and the brow bearing the imprint of the final struggle. This figure is of white marble, while the figure of Diana herself kneeling at his head and the figures of the Virgin and Child at his feet are of alabaster. The four Corinthian columns, between which lies the sarcophagus, are of black marble, with caps and bases of alabaster. Above in a niche is the life-size equestrian figure of De Brézé, panoplied in full armor as became the Grand Seneschal and Governor of Normandy, and an honored servant of his master. The caryatid figures at the right represent Prudence and Glory, the pair at the left symbolize Victory and Faith. Higher up in the niche that crowns the composition is a seated figure which is indifferently called Force, Justice and Prudence.

In its conception, in its execution, in its coloring and in its association of ideas it is one of the most notable sepulchral monuments that exist, and one cares not whether it was erected hypocritically as a disguise for future misdoing or in all faith and earnestness of purpose. Diana of Poitiers was not the only woman who saw fit to change her mind, and as she found good reason for not eschewing male society as she intended, so she probably found as good reason for not arranging that her body should be placed beside her husband's, as the inscription there promises. She was buried at Anet, where Henri had built her one of the most beautiful palaces of the French Renaissance period, whereon appeared with profusion the well-known monogram of king and mistress, and where Cellini executed some of his most cunning designs.

The other monument which finds a place in this group, owed its being to quite another sentiment. In 1852, Arthur Wellesley, Duke of Wellington, was carried to his tomb in St. Paul's, with perhaps, more of pomp and ceremonial than ever before any Englishman of less than royal birth was honored with. The great expense of the pageant was met by a Parliamentary vote of public funds, the size of which may be guessed from the fact that four years later there was found to be an unexpended residuum of £20,000 — a fact that the American committee-man of to-day will find inexplicable. Instead of covering this balance back into the treasury, it was decided to use it in the erection of a suitable monument to the Duke and a competition, with a first prize of £700, was opened to all the world. The final outcome was an amusing exemplification of the adage "the last shall be first," for Alfred Stevens, to whom the work was at length entrusted, gained only a minor prize of £100 in the competition, while the first and second prize-men, W. Calder Marshall and W. F. Worthington, in place of being allowed to carry their own designs into execution were obliged to content themselves with modelling each a bas-relief to be set in the rear wall of the chapel in which Stevens's monument now stands in the south aisle of St. Paul's. This substitution was brought about by the action of Lord John Manners, a most masterful man, and in 1858 at the head of the Office of Works. Up to this time nothing had been done in the matter beyond paying the prizes, but Lord John shortly after his installation in office got out the designs looked them over and decided that Stevens's was unquestionably the one to be executed, and accordingly made a contract with him to carry out the work for the £14,000 which was all of the original sum that the commissions to the disappointed first and second prize-men would leave. It was made a condition that a full-size model should be set up in St. Paul's before the work went farther, but during the eight years Stevens was working on his model this condition was forgotten and the model never left the sculptor's studio. In 1867, the sculptor was ready to begin on the actual construction, and work on it progressed steadily at first and then at uncertain intervals as the state of his failing health would allow. Fortunately the monument was so far completed at the time of his death, in 1875, that it was possible for his pupil, Mr. Hugh Stannus, to finish it — but not in its original integrity. Lord John Manners was not the only man who held the Office of Commissioner of Works who had an inflexible belief in his own judgment and taste. Mr. Ayrton who held this office at a latter date, if half the many stories narrated of him are true, must have been about the most pig-headed official who ever had the chance to work injury to art. He decided that it was wholly out of the question that a monument to be set up in a consecrated edifice should be surmounted with an equestrian group — and in this decision he was supported by the Dean of St. Paul's, and so it came about that the monument was deprived of half of its intended excellence; for good as the architecture and sculpture of the finished portion are, it was generally understood that Stevens intended that the equestrian group should be the part to stamp the whole with the individuality desirable in a public monument to such a man. It is more than likely that this enforced mutilation of his design, together with the placing of it in a side chapel only 57 x 25 feet and 43 feet to the vaulting, a height which is nearly entirely taken up by the present unfinished structure, had much to do in bringing about Stevens's death. The monument was designed to stand free, in the space between a pair of the nave piers. Shortly after the sculptor's death, English artists joined in a general petition to the Commissioner of Works that the equestrian group should be cast and set in place, so it is still possible that the design may be completed. At any rate, there is sufficient reason for including it with the other dual effigies.

[Correction. — In the last paper of this series the name of the sculptor of the statue of Baldwin, of Flanders, was given as Hector Lemaire: it should have been credited to J. J. Jacquet.]

Ladislaus. — King Ladislaus was a proud, ambitious, prodigal and dissipated man. He died at the early age of thirty-six, A. D. 1414. He was called "The Victorious." After the death of his father, Charles III, his mother became regent and an opposite party proclaimed the son of the Duke of Anjou King. As Ladislaus advanced to manhood, he displayed superior qualities, and by degrees drew the nobility to his flag. He finally captured his native city and was proclaimed King. He also, after once unsuccessfully attempting it, finally captured and plundered Rome. Ladislaus conceived the project of the unity of Italy which was not realized till four centuries after his death.

Ciccione. — Ciccione is also the author of a monument in the same church to the Grand Seneschal Gian Caracciolo and is said to have built the churches of Santa Marta and Moute Oliveto in Naples.

De Valence. — Aymer de Valence, Earl of Pembroke, was the son of William de Valence and cousin to Edward I. He was much employed as a general in the wars with Scotland where he captured and put to death Nigel, the brother of Robert Bruce. He also took part in the punishment of Piers Gaveston, the unworthy favorite of Edward II, and in 1321 assisted that monarch to defeat the confederate Barons at Pontefract, and to execute their powerful leader, Thomas, Earl of Lancaster. Aymer de Valence was assassinated in France in 1323, it is thought by some in revenge for his share in the death of Earl Thomas. Others say that he was killed in a tournament which he held in honor of his (third) marriage with a daughter of Guy de Chastillon, Count de St. Pol.

Crouchback. — Edmund Crouchback, Earl of Lancaster and the founder of that great House, was the second son of Henry III and was born in 1245. When Crouchback was but eight years old Pope Innocent IV sent him a gold ring investing him with the sovereignty of Sicily and Apulia but, he failing to support this claim, the grant was revoked by Pope Urban in 1263. He accompanied his brother Edward, then Prince of Wales, to the Holy Land on a Crusade.[1] His first wife was Aveline, daughter of the Earl of Albemarle, who lies close by. Blanche, Queen of Navarre, was his second spouse and with her he lived for a time at Provins, from whence they brought the famous red roses planted there by Crusaders from Palestine and destined to become the Lancastrian badge. Crouchback died in 1296 at Bayonne, after an unsuccessful attempt to conquer Guienne.

Shurland. — Sir Robert de Shurland, Lord of Shurland, in the parish of Eastchurch, adjoining Minster, was the son of Sir Geoffrey de Shurland, who was Constable of Dover Castle in the time of Henry the Third. Sir Robert was Lord Warden of the Cinque Ports; and was made a Knight Banneret by King Edward the First for his brave deportment at the siege of Carlaverock in 1300, and was probably a benefactor of the monastery of Benedictine Nuns at Minster, in Sheppey.

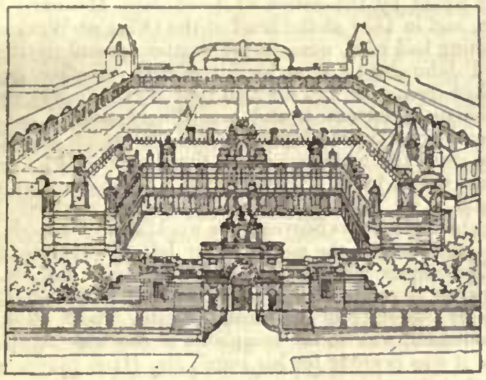
Duc de Brèze. — Louis de Brézé, who was Count of Maulévrier, Grand

[1] Stothard, however, says "In 1269 he was marked with the cross at Northampton by Ottobon, the Legate of the Pope, with his elder brother Edward, the Earl of Gloucester, and many other nobles of the land: one of those nominal crusades which procured for the See of Rome so many golden crosses in current coin."

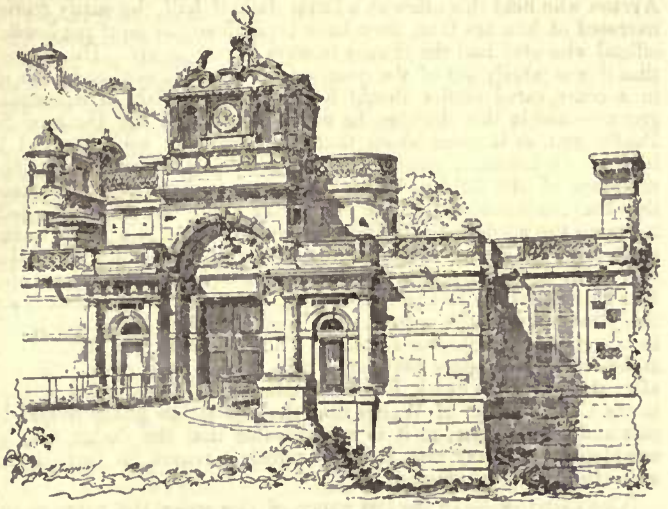
Seneschal and Governor of Normandy, grand huntsman of France and first Chamberlain to the King, and held many other high offices, died in 1531, aged 72. His second wife was Diana de Poitiers, mistress of Henri II.

DIANA DE POITIERS. — A beautiful French lady, born in 1499. Having been left a widow by the death of her husband, Louis de Brézé, in 1531, she soon after gained the affection of the King's son, who in 1547 ascended the throne as Henri II and gave her the title of Duchess of Valentinois. She had a complete ascendency over the King, who allowed her to exercise royal power and to control even the foreign policy of the Government. De Thou attributes to her the misfortunes of Henry's reign and the persecution of the Protestants. By her graces and talents she retained her influence over Henry until his death in 1559. She died in 1566.

ANET.— It was at the old château at Anet that Diana first entertained her youthful lover and it was only natural that at that place he should build the more sumptuous palace for her which is looked on as the special glory of the architecture of that time. In 1548, Philibert de l' Orme began to execute his design, and it was hardly finished in 1552. In certain ways he was obliged to adapt his fancy to the foundations of the older work and complained loudly because of it, and more at having to preserve some portions of the old work, particularly that part in which, in the Spring of 1535, the Dauphin first passed the night. In spite of this the architect accomplished a most imposing edifice which consisted of a square central court with lateral courts on either hand devoted to the domestic portion of the inhabitants: behind the building, full width, stretched a large garden surrounded with open galleries and at the extremity stood a large loggia, which was used as a bath, with a semi-circular basin behind it into which cascades poured from the building above. The entire structure was surrounded by a moat and entrance was had over a drawbridge, which at the end of the seventeenth century was replaced by a stone bridge: this principal entrance is the one which is so frequently illustrated, containing as it did in the tympanum of the arch Cellini's well-known bas-relief of the "Nymph of Fontainebleau" with the group of stag and hounds surmounting all. At the back of the court of honor was the pavilion, the façade of which now stands in the court-yard of the Ecole des Beaux-Arts. The left (west) wing, the chapel and the entrance are all that is now left of this sumptuous palace. In the left-hand court-yard was the famous fountain by Jean Goujon, decorated with the nude statue of Diana of Poitiers herself leaning with an arm affectionately cast about the neck of a stag of ten tynes, — the group is now in the Louvre. At the death of Diana the palace became the property of her daughter Louise de Brézé, whose son Charles de Lorraine, one of the most prominent leaders of the League, was dispossessed of it in 1595, and in accordance with the law, if it had been followed to the letter, the palace should have been razed to the ground as belonging to one attainted with high treason. But Charles, who escaped to Brussels, and so was executed only in effigy, was no more lucky than his palace, for Henri IV expressly prohibited its destruction. But it fell into the hands of a creditor of Charles de Lorraine, the Duchess de Mercœur, in 1615, and she caused her daughter to marry the natural son of Henri IV and Gabrielle d' Estrées, César, Duc de Vendôme, whose grandson was the famous General Louis Joseph de Vendôme. At her death his wife bequeathed the palace to her mother, the Princess of Condé, and in 1734 it passed to the Duchess of Maine. It then passed under several different owners, amongst others Louis XV and Louis XVI. The latter restored it to the Duc de Penthièvre, Grand Admiral of France, who repaired it with utmost care. In spite of being a Bourbon Prince, the Grand Admiral was universally beloved, and consequently was not disturbed during the early years of the Revolution, so that he died there in peace. The place was then declared National property, sold at auction and fell into the hands of certain bankers who dismantled it by selling to the curator of the museums such decorations and works of art as the public collections desired, and then began to tear it down with the mere object of selling the stones as building material. The work proved slow, tedious and expensive, and finally in 1810, the contractor without telling any one what he intended to do, blew up a portion of it with a heavy charge of powder. This outrage stirred the people to open protest and finally, in 1811, the work had to be abandoned to avoid a riot. Fortunately, the demolition had begun with the rear-most buildings. In 1820 the Duchess of Orleans bought the place for $32,000, and once more it began to change hands with some rapidity. In 1844 the chapel was restored, and in 1852 the entrance was restored under the supervision of the Commission on Historic Monuments. In 1860, the left-hand wing was restored by the present proprietor, M. Ferdinand Moreau.



Chateau d' Anet.[1]



Main Entrance to the Chateau d' Anet.[1]



Diana's Fountain.[1]

[1] From "*L' Encyclopédie de l' Architecture et de la Construction.*"

GOUJON. — Jean Goujon is thought to have been born about 1520, though the time and place of his birth are still uncertain. His name appears in the accounts of the church of St. Maclou at Rouen in 1540, and in the following year he worked in the cathedral of the same town. He was afterwards employed by Bullant on the Château d'Ecouen and by Lescot on the restorations of St. Germain l' Auxerrois. Four bas-reliefs of the Evangelists made for the gallery of this church, are now in the Louvre. In 1547 there was published Martin's French translation of Vitruvius, with illustrations by Goujon. His principal works are those on the Louvre, including the carvings of the southwest angle of the court, the reliefs of the Escalier Henri II, and the Tribune des Cariatides; the reliefs of the Fontaine des Innocents and of the Hôtel Carnavalet, at Paris; and the group of "Diana with the Stag," executed for the Château d' Anet which was built for Diana of Poitiers. This is now in the Louvre. Goujon was a Huguenot and is said to have perished in the Massacre of St. Bartholomew's day, 1572.

COUSIN. — Jean Cousin was born at Soucy, near Sens, about 1500 and died about 1589 at Paris. Little of his life is known with certainty, except that his first occupation was glass painting at Sens, and that afterwards he was established as a goldsmith at Paris. He was both painter, sculptor, architect, engraver, mathematician and writer. The only authentic painting by his hand is the "Last Judgment," now in the Louvre, though various other subject pictures, portraits and miniatures are attributed to him. Of his glass paintings, the finest are the windows of the Sainte Chapelle at Vincennes. Other windows by him are at Sens Cathedral and the Château d' Anet and the Church of St. Gervais at Paris, possessed glass paintings by him. Those at the latter place were destroyed about 1775. Cousin's most famous sculpture, apart from the De Brézé tomb (if that be his work), is the recumbent figure of Philippe de Chabot, Admiral of France, now in the Louvre. Cousin engraved on metal and left several etchings. It is by his designs for wood-cuts, some of which he himself engraved, that he is now best known. They include illustrations of the Bible, the "Songe de Poliphile," and the "Metamorphoses" and "Epistles" of Ovid. Among his written works are a "*Book of Perspective*" and a "*Book of Portraiture.*"

STEVENS. — Alfred George Stevens was born in Blandford, Dorsetshire, in 1817. At an early age he displayed marked talent in the direction of art and was sent to Italy by a generous patron, the Rev. Samuel Best. There he remained some ten years, studying and copying the works of the old masters and also in the studio of Thorwaldsen, who gave him several commissions. Returning to England in 1843, he was given an appointment in the Government School of Design at Somerset House, but after a few years removed to Sheffield, where he produced a quantity of decorative designs for a firm of stove and grate manufacturers of that town. Going back to London in 1851, he divided his time between minor decorative work and ambitious designs for various national competitions, among them being the new Foreign Office buildings and the memorial of the Exhibition of 1851. He also produced a scheme of decoration for the great reading-room of the British Museum and one for the dome of St. Paul's Cathedral, together with a design for bronze doors for the Geological Museum in London. None of these were carried out, except that Stevens's figure of "Isaiah" for St. Paul's has been executed in mosaic by Salviati and placed in the dome. In 1858 Stevens received the commission for the monument to be erected in St. Paul's to the Duke of Wellington. This is his most famous work and next are some decorations in Dorchester House, in Park Lane, London, the residence of Mr. R. S. Holford The chief of these are a marble mantelpiece supported by two female figures and a sideboard in walnut, both in the dining-room. Among the minor works of Stevens are portions of the railing and the great grille of the British Museum; a diploma for the Exhibition of 1862; some admirable portrait busts; and numerous designs for house decoration, furniture, porcelain, and metal work. Stevens believed in the unity of art and like his great model, Michael Angelo, was at once painter, sculptor and architect. Nothing was too small or insignificant for him to lavish all his art upon and nothing was beyond his powers. He died in 1875.

(To be continued.)

ARCHITECTS' NAMES ON BUILDINGS. — Among those whimsical absurdities to which custom reconciles us is that of inscribing the name of the architect and the date of a building, not where they can be seen, and convey such information at a single glance, but where they must remain unseen forever, namely, on the foundation-stone. Surely this practice must have been of Irish origin, since a more blundering one, and one more contrary to the plainest common sense, can hardly be conceived. It is all very well to bury underground the names of lord mayors, or other official worthies and dignitaries who assist at the ceremony of laying the first stone, because it matters not how soon they and everything relating to the childish silver-trowel part of the business are forgotten; but that there should ever be any mystery or room for doubt as to who was really the architect of a building, when all uncertainty might be obviated by a mere name and date, is quite preposterous. Besides which, it is very likely to happen, and often does happen, that a structure is either rebuilt, or nearly, on its old foundations, and in such cases what becomes of the veracity of the inscription on the foundation-stone, should it ever come to light at all? Had architects invaribly made it the practice to affix their names to their works, we should now be at no loss to know who we are indebted to for those noble fabrics of olden time which are the admiration of all. Why it should not be done I do not understand, when every engraver puts his name to the plates he executes. Neither would there be any occasion that the architect's name should be ostentatiously displayed; for were it cut merely on the lintel or architrave of a door, the platband above a basement, or some member of that kind, it would not obtrude itself on the eye, nor discover itself till sought for. — *W. H. Leeds.*

ARCHITECTS AS AGENTS.



To facilitate business, and as a more convenient form of undertaking the duties of the architect, there are many who accept commissions, and then contract with artists and tradesmen to carry out the work. In this manner the duties and responsibilities of the architect are, if not legally, practically shifted to another party, who undertakes to carry out the intentions of the architect upon his own responsibility. We have no intention here of expatiating on the advantages this sort of "sub-contracting" — to use a phrase that applies more correctly to the work of the builder than to the architect — offers to one who is ready to carry on his profession on an expeditious and commercial principle. The architect's labor is minimized, the details, at least, of the design are furnished, and his deputy has nothing more to do than to perform his work in a business and perfunctory manner, quite regardless of high scruples or the nicer dictates of conscience. He submits a design or specification to his employer for carrying out the work at a given amount, offering to do anything to meet his approbation or approval. The contract is sealed between the parties — virtually the architect and tradesman, nominally the employer and tradesman. The difference between this and the usual and proper form of contract is that the architect and contractor are virtually one; their interests are almost the same, for the architect accepts the design and workmanship of the contractor, instead of preparing his own design and specification, and in this capacity he takes the place of a middleman, acting merely as the agent between employer and workman. It may be argued that in a large number of cases the "employer, architect and contractor" arrangement, in which the architect acts as independent artist and mediator, is practically the same as the above-mentioned transaction, inasmuch as the busy practitioner has little time to examine the work and to exact the terms of his own specification; that, practically, the contractor does very much as he likes. No doubt he can. Very often, although bound by contract to conform and comply with the architect's design and instructions, he uses his own discretion, and the building is really very little better than what the contractor cares to make it for the sum at his disposal. Not only may we acknowledge the force of this assumption, but we have practical evidence that in several instances the architect's intervention has been of very little account in the total result, and it is necessary to point out under what circumstances the agent-architect may act as efficiently as the individual who prepares a design and specification for a work which undergoes various modifications in its execution. First, we may bring to the reader's notice a class of architectural work which can be more skilfully and efficiently accomplished by the specialist who has devoted his whole life's study to the subject. Let us, for example, take the work of the art-decorator. Scarcely one out of ten architects have made the question of decoration and color a subject of study — not a very flattering admission to make as to a profession which ought to include the subject of decoration as a special branch. So it is, however. The practical requirements of building and surveying have been the all-absorbing questions, leaving very little opportunity, and often, we regret to say, very little inclination for art attainments. Probably it is no libel on the practical architect to say that he is quite unqualified to suggest a scheme of decoration for a house he may have designed and carried out, certainly incompetent to prepare a design for the decoration of a church or public hall. What should a man versed in construction, building materials and measurements understand about primaries and complementaries, harmonies and contrasts? Keys, tones and shades are almost mysteries to him. In this department of the profession, therefore, the experienced decorator has more skill, and presumably more taste, than the ordinary architect, and is, consequently, more fitted to design a scheme of color-decoration and specify for its proper execution. If the architect interferes he may do injury. At the present moment we know of at least two public undertakings of a decorative character that have been placed in the hands of one of our leading firms of decorators, and who are associated in name more than in reality with well-known architects in the conduct of the work. In these cases the architects of the respective buildings have advised generally, their names being a guarantee of the design and efficient execution, though the whole scheme has been practically left in the hands of the firm of decorators. The general scheme has been submitted to and approved by the architects whose names are connected with the work, but the details, and selection of the style of ornament and selection of colors, have been left to the artists, and the results in both cases are eminently successful.

In artistic ceramic work, the ordinary practitioner would do well to obtain some technical advice before he prepares a design, and here, also, the specialist is better able to advise and to write the specification. In stained and painted glass-work, the taste and skill of the glass-painter, the knowledge of ecclesiastical symbolism and of the glass-work of the Middle Ages are necessary to the preparation of a design for a series of figure-subjects for a church. Few architects would consider themselves competent to prepare such designs or equal to the task of instructing the artists, and this class of design is left to the taste and advice of some well-known artist and manufacturer. Ecclesiastical woodwork is another class of art-design which the ordinary architect understands very little about. May he not, therefore, be doing both justice to himself and client if he obtains other advice, and places his rough ideas in the hands of the ecclesiastical furnisher? The worker in brass and iron must know more about the technical points of his trade than the architect is expected to do. Now in all these cases the expert is naturally more skilful, and must be expected to know more about the points of good design than the architect himself. Yet custom has placed all these special artists under the control of one individual, whose designs and instructions they are supposed to carry out. Practically, as we have shown, these experts have their own way. Indeed, the manufacturer, in the plenitude of his power, is apt to ask why it is the employer is so short-sighted as to have engaged a person to design and prepare specifications for work about which he knows nothing, which he could have carried out equally as well, if not better, single-handed. One often hears these remarks, and the answer to them is, briefly, that the executant is not always the most capable of advising on the general design; that the architect, by his general knowledge of the building and his client, is more capable of ordering the work, leaving the details to those who are entrusted with the execution. On the other side of the question, there is, we admit, a danger in thus placing one's self unreservedly in the hands of the contracting firm. The decorator may prove arbitrary and dictatorial, and make it very difficult for the architect to assume authority over a matter which he has delegated to another. The architect, perhaps, has left everything to the judgment of his colleague, and has no power to interfere. Designs and specifications have been prepared by the contractor, who undertakes to carry them out for a certain sum. The terms of the agreement are here important, and ought to be framed in such a manner as to give the architect the power of making any slight modifications that may be suggested. The approval of the scheme of decoration is even more essential; the architect should take the trouble to satisfy himself of the soundness of the proposals offered to him, and even consult a competent person if his own taste is not to be relied on. If possible, the architect should give a rough design of the scheme, and make it the basis of the drawings or cartoons submitted to him by the artist. An able and respectable firm should always be engaged, more especially if the work is to be left entirely to them. The difficulties and want of agreement between the contractor and the employer arise mainly from the want of arranging the preliminaries. In the early drawings of a building that is intended for decoration, attention ought to be given to the subject; and an early consultation with the artist to be employed, before the details are finally agreed to, would save many awkward misunderstandings.

The design of constructional ironwork is a matter about which the architect knows very little as a rule. We will suppose that the architect is preparing a design for a corn-exchange or market, over which an iron roof or domical centre-lantern is intended. Is he justified in conferring with an expert or engineer before he completes his design, or should he finish his plans and submit them to the engineer to prepare the necessary details for the ironwork? The answer will be a matter of individual competence. The properly-qualified architect ought to be able to complete his general design in all essential points, and then consult the engineer about the details, the sizes of members to bear certain strains, and the details of putting together. It would be wiser for the younger and inexperienced architect to obtain the advice of the engineer before the plans and sections are finally inked-in, to allow any suggestions to be made. The detail drawings may be left entirely to the engineer to prepare with his specification and estimate; or the architect may ask an engineering firm to make a design and estimate for the work complete, in which case the architect simply acts as an agent for his employer, but cannot be credited with the design, so there are degrees in which the special work is delegated. It is well-known that the late Sir Gilbert Scott obtained the advice and assistance of an eminent engineer in the design of the great pointed, ribbed roof over the Midland Railway terminus in the Euston Road, and also in the strengthening of the spire of Salisbury Cathedral — works which reflect credit on

both architect and engineer, combining, as they do, the results of the highest architectural taste and constructive skill.

These arguments only prove that the architect's work must, as a matter of necessity, be made up of his own skill and taste and the knowledge and experience of others; that in many instances he has to act in the capacity of an agent, employing and arranging the highest technical craftsmanship he can command; in other instances, as an architect proper, designing and directing the labor of others. It should be his earnest wish to assume the latter *rôle* more completely by mastering details and extending the artistic functions of his profession; and in these cases, where he is obliged to call in the advice of the specialist, he may do so with discriminating intelligence. We wish we could see more of this spirit of independent thought and conscientious labor manifested amongst the ranks of the profession. Unfortunately, there is a strong inclination to shirk work and responsibility when any unusual skill is necessary, and a growing desire among the firms of contractors to take advantage of this spirit by offering their services in the design of buildings, fittings and decorations with which they may be intrusted as contractors. — *The Building News.*

SOCIETIES

A. I. A. PRELIMINARY NOTICE.

September 19, 1889.

THE joint Convention of the American Institute of Architects and Western Association of Architects will be held in Cincinnati, opening on Wednesday, 20th of November next, at 10 A. M.

The Annual Reports to and of each organization will be read, and the Constitution and By-Laws recommended for the reorganized Institute by the joint Committee on Consolidation, appointed by the two bodies, will be submitted for the final action necessary to consummate unification.

This will be followed by the reading and discussion of professional papers.

An Exhibition of Architectural illustrations, under the direction of the Cincinnati Architectural Club, will occur simultaneously with the Convention, and a reception will be given by the Club on the evening preceding the opening of the Convention, *viz.:* Tuesday, November 19th, to which all the members of both existing organizations are cordially invited.

Before the close of the Convention, opportunities will be afforded for the inspection of the prominent and interesting structures of the city, finished or in process of erection.

Members of either existing organization, having communications or papers of interest to the profession, which they propose to submit to the joint Convention, should forward them to the appropriate Secretary before the 1st of November ensuing.

Full particulars will be forwarded, in due course, to the members, alike of the existing Western Association of Architects and American Institute of Architects.

Joint Committee of Arrangements: E. H. Kendall, Chas. Crapsey, N. S. Patton, *Secretary* W. A. A., 44 Montauk Block, Chicago, A. J. Bloor, *Secretary* A. I. A., 18 Broadway, New York.

RHODE ISLAND ARCHITECTS' ASSOCIATION.

THE annual meeting of the Rhode Island Chapter of the American Institute of Architects was held on Wednesday evening at the Hotel Bristol. Officers elected for the ensuing year were: *President*, Alfred Stone; *Vice-President*, Howard Hoppin; *Secretary*, Edward I. Nickerson; *Treasurer*, James Fludder. The membership at present is as follows: Alpheus C. Morse, Alfred Stone, Edward I. Nickerson, Charles E. Carpenter, James Murphy, George W. Cady, James Fludder, Howard Hoppin, Thomas J. Gould, Frank W. Angell, Edmund R. Wilson, Franklin J. Sawtelle, Charles F. Wilcox, Frederick E. Field, Walter G. Sheldon and Frank F. Tingley.

THE NATIONAL EXHIBITION OF ARCHITECTURAL DRAWINGS AND SKETCHES.

CINCINNATI, OHIO, September 27, 1889.

The publication of our Illustrated Catalogue entails much work upon the Committee having it in charge. It is the intention of this Committee to publish an Artistic Catalogue, and to do this, it is of paramount importance that all catalogue illustrations be received promptly. The Committee therefore requests that they be expressed as soon as possible, to John Zettel, Secretary, 227 Main Street. The latest date on which these designs can be received is October 19.

It is also respectfully urged that the schedules previously sent, be filled and returned at an early date.

The letter accompanying this circular is indicative of the interest taken by our people here, and its contents are heartily commended to you.

In closing, attention is called to the following important instructions, *viz.:* All contributions must be expressed to arrive here not later than November 10. All catalogue illustrations must be here by October 19. Lack of time prevents a personal letter, hence this circular.

Again soliciting your co-operation,

G. W. E. FIELD, *President*, C. A. C.

CINCINNATI, OHIO, September 26, 1889.

JOHN ZETTEL, ESQ., Secretary Cincinnati Architectural Club:

Dear Sir, — Present our compliments to the Club, and say, to interest all concerned, we beg to offer as a special premium a silver medal as an award for best design and drawings, complete, of the hardware necessary to complete a door, *viz.:* hinges 5 x 5, mortise lock, knobs and combined escutcheons. Also, such hardware as is necessary to complete a window, with inside blinds, *viz.:* hinges 1¼ x 2, shutter knob and bar, sash-lock and flush or rim lift. The design to be Romanesque. The prize-drawing to be ours after such competition and award is made in accordance with judges' decision.

Respectfully,

WAYNE HARDWARE CO., C. E. STEWART, *Secretary.*

THE ARCHITECTURAL LEAGUE OF NEW YORK.

THE first regular autumn meeting and dinner of the League, will be held at Morello's restaurant, No. 8, West 29th Street, on Monday, October 7, at 6.30 P. M.

The evening will be devoted to a general discussion of the American Fine Arts Building, and to the election of a jury for the Fifth Annual Exhibition.

The Committee on Current Work, respectfully announce, that after 4 P. M., on the day of the meeting the DeVinne Press Building, through the courtesy of Theodore L. DeVinne & Co., will be open for inspection to the members of the League, on presentation of the enclosed card.

Mr. Willard, of Messrs. Babb, Cook & Willard, has been asked to conduct the members through the building.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A QUESTION OF CHARGES AND PROCEDURE.

September 24, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Kindly let me have your opinion or that of some of your correspondents on the following: An architect who has furnished two sets of drawings (originals and tracings) to trustees, and is employed to superintend the building; the trustees who think the contractor requires to be watched while the architect is absent (the work being in the country) ask to have a second set of tracings, so as to enable them to watch builder. They were informed at the time a something would be charged extra for an extra set of tracings. They did not then object. Before a full set of extra tracings was delivered, the builder was suspended by the architect for carelessness and incompetence. His tracings were then turned over to the foreman employed by the trustees to finish the work, consequently the part of the extra tracings then supplied were unnecessary. Are trustees liable to pay a fair price for said tracings? When builder was suspended trustees called on architect to ascertain the cost of finishing work. This he did, measuring up the entire work from drawings and giving credit for the work already performed. Architect charges two per cent on cost or amount of estimate. This is one-half per cent more than usual for measurers' or building surveyors' fees. Is he entitled to this charge over and above his fees for plans and superintendence and under the circumstances to the extra one-half per cent? The job is now complete so far as the money will allow, and they don't at present propose a vote for more bonds. He has written to the trustees charging the items referred to, but they refuse to pay him. He also asks the return of all tracings, drawings, details, etc., as provided to be returned at completion of work by contractor. The trustees have not deigned to notice that part of the correspondence. Can the architect sue for the return of his drawings or can he sue for liquidated damages for said detention? Yours, "EQUITY."

[THIS case is not perfectly clear. As we understand "Equity's" letter, he furnished only one set of tracings, keeping the original drawings himself. We do not think he was bound to furnish another set of tracings gratuitously, but such matters are usually amicably arranged, and in this instance it was probably for the architect's advantage to have the assistance of the trustees in supervising the work, so that he could afford to make his charge for the extra tracings moderate. As to the proper charge for ascertaining the cost of finishing the building, after the suspension of the contractor, we could hardly judge without knowing more of the circumstances. Two per cent on the cost might be a perfectly fair remuneration, but it would perhaps be better to charge a reasonable rate per hour, or per day, for the time occupied, rather than a percentage. A surveyor assumes a heavy responsibility, besides spending his time and skill on such an estimate, and by the percentage system he is compensated in some sort of proportion to the responsibility laid on him. In the present instance, the architect seems to have

been simply asked for an opinion in regard to the cost of completing the work. Such an opinion from an architect could not be more than an estimate, involving no responsibility for its correctness within wide limits, and, even though measurements were made from the plans, it does not follow that a surveyor's fee was earned. In regard to the return of the drawings, we should say that the "completion of work by the contractor" was intended to mean the completion of the building, and that the trustees were entitled to keep them as long as they would be of use in the work, notwithstanding any temporary suspension of operations. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

STATUES OF COLUMBUS. — The *Boston Journal* having rashly stated that the United States possesses but one statue of Christopher Columbus, and that one given to Baltimore by a French consul in the last century, somebody writes to say that there is a second in Fairmount Park, Philadelphia, and a third, of granite, in the old arsenal in Central Park, New York, presented in 1869 by the late Marshall O. Roberts. A fourth exists in Boston itself, of marble, and stands in so well-known a spot as Louisburg Square. It was presented to the city in 1849 by Mr. Joseph Iasigi, a Turkish merchant, who became an American citizen, and whose children are prominent members of the community. — *N. Y. Times.*

PROPOSED PARIS SHIP-CANAL. — The commission appointed to inquire into the scheme for making Paris a seaport has now issued its report. In this it is stated that the canal is of a nature to increase the commercial activity of France by bringing Paris into more direct communication with the great producing centres, and would, in particular, enable the city to compete with Antwerp, the commerce of which, it is said, is increasing year by year, to the detriment of French ports. No insuperable engineering difficulties are to be encountered; and, even taking the most pessimistic estimate of the cost, viz., 200,000,000 francs, it is believed that the traffic would be sufficient from the very commencement to earn interest on this. French estimates of the expenses of canal construction will, however, be received with some caution after the gigantic *fiasco* of Panama. Proceeding, the report goes on to say that the heavy sacrifices made by France in the past few years have not succeeded in meeting the competition of Antwerp, the trade of which has risen in a few years from 1,000,000 to 7,000,000 tons, and affirms that the only chance of doing so now is by rendering Paris accessible to sea-going vessels. It is further stated that, in the event of another war, it would be impossible to starve out Paris, as in 1871, were the canal made, though it is not easy to see the grounds of this statement, as one would think that the canal could be blocked without much difficulty. The canal would be 180 kilometres long, and a depth of 6.2 metres is proposed for the channel, the breadth of which at the bottom should be half as wide again as at Suez. The spoil from the excavation could, it is said, be advantageously disposed of in raising the level of some low-lying lands along the banks of the Seine. Whether the work will be undertaken by the Government remains to be seen, but it is, on the whole, unlikely, as the engineers of the Seine are said to be opposed to the scheme; and, if the Government do not take it up, no other body in France will; of that we may be certain. — *Engineering.*

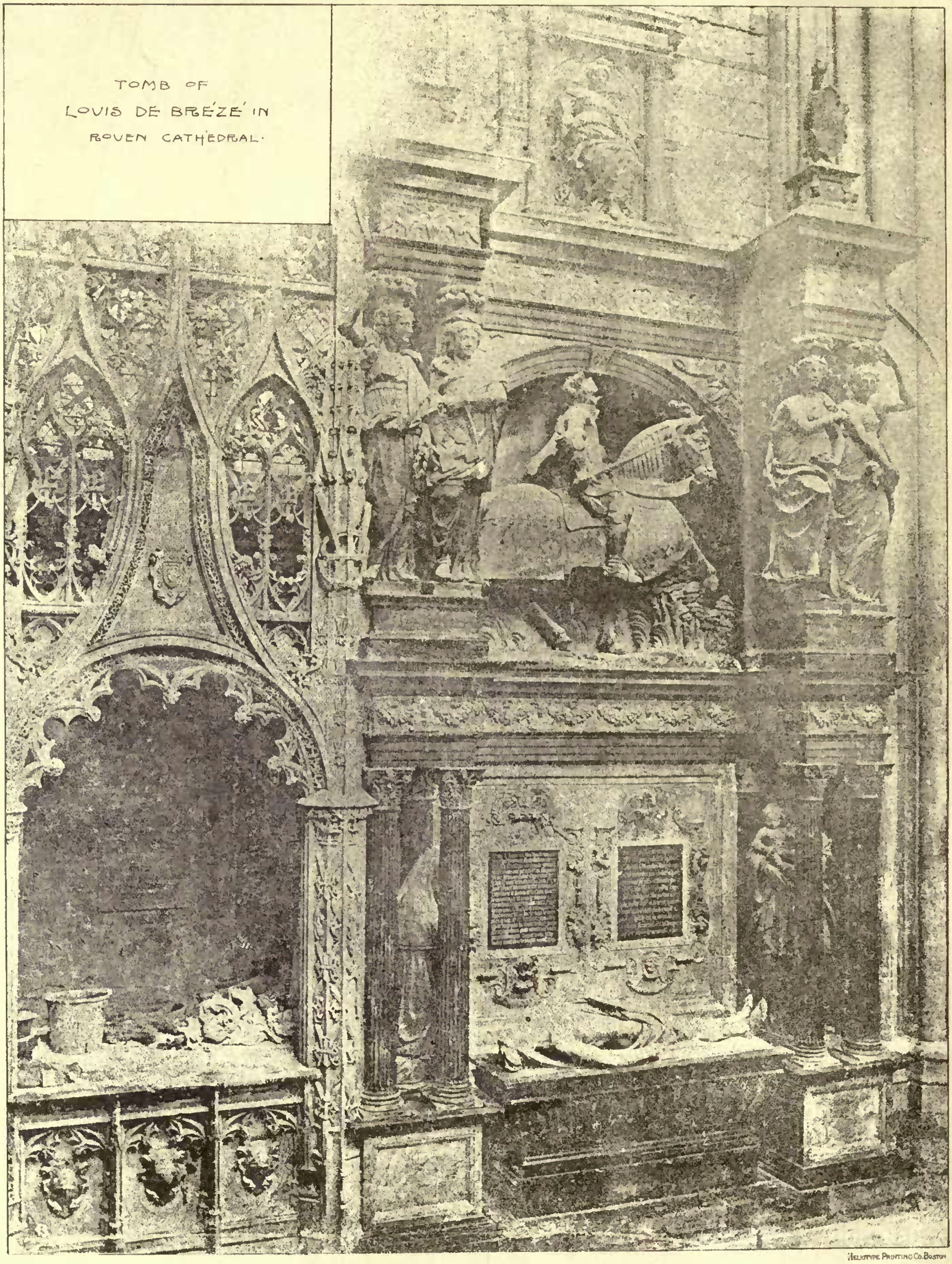
THE CHURCH OF VASILI BLAGENNOI. — The history of the church of Vasili Blagennoi is as strange as its aspect. It was built by order of Ivan the Terrible, at the expense of the principality of Kazan, as an expression of gratitude to God for the czar's conquest of that country. The name of the architect, an Italian, is unknown, but tradition relates that his eyes were burnt out by order of Ivan to prevent his designing in future any more wonderful monument. "It is my wish," said the terrible autocrat, "that this sanctuary remain the unique and glorious monument of the genius of this man." In the basement of the edifice are two chapels, and on the upper story nine chapels, surmounted by nine cupolas, each different in shape, dimensions, color, details, style and structural disposition. The spire, too, is placed at the east and not at the west, as orthodoxy demands. The façades, again, are all different and without discernible plan, and the whole structure, with its suggestions of Hindoo, Byzantine, Gothic and nondescript architecture, and its profusion of painted ornaments and masses of crude yellow, blue, red and green, forms an admirable and mysterious harmony, the secret of which none can explain, and the charm of which no words can describe. The whole exterior, with its superimposed arches, its profusion of color and gilding, its painting of roses and other flowers in panels all over the walls, is strangely original. On the pedestal formed by the nine chapels and their basement are placed belfries and cupolas starting upward from masses of masonry resembling the imbricated foliage of the artichoke, the scales of the pine cone, or the opening buds of the cactus flower. In the chief belfry the Italian element is clearly perceptible in the first three stories, above which is a story resembling an Indian pagoda, which in its turn is surmounted by an hexagonal crocketed spire, on the summit of which is a lantern and an onion-shaped gilt cap. Another belfry supports a cupola in the shape of a pineapple all covered with pointed facets; on another the pineapple cupola is laced over with a symmetrical network through whose meshes the points alone are visible. Another cupola imitates the ribbed form of a melon; another, the twisted folds of a monumental turban; another, the close scales of the serpent. Let it be remembered, too, that each of these cupolas is of a different color — one orange, another sky-blue, another apple-green, another deep red; and that, besides paint in profusion, the mouldings, cornices, consoles, panels, pinnacles, imbrications and tiers of arches are lavishly decorated with brightly-colored glazed faience. Of this fantastic architectural dream, suggestive of uncanny sea monsters, half-fish and half-flower, of gigantic fruits, or of vegetables and Oriental turbans of such capricious and impossible proportions as one might conceive in a nightmare. Théophile Gautier has given us a poet's description, which we cannot do better than cite: "The Church of Vasili Blagennoi," he says, "is without doubt the most original monument in the world; it recalls nothing that one has ever seen, and belongs to no known style. One might imagine it to be a gigantic madrepore, a crystalized colossus, a stalacite grotto turned upside down — a thing which has neither prototype nor similitude. It might be taken for a Hindoo, Chinese or Thibetan pagoda In looking at this impossible church one is tempted to ask if it is not a whimsical will-o'-the-wisp, an edifice formed of clouds fantastically colored by the sun, which the movement of the air will presently cause to change in form or vanish into nothingness." — *Boston Transcript.*

TRADE SURVEYS

THE manufacturing interests ordinarily pay very little attention to the fluctuations of bank reserves, rates of money, and mere financial indications generally, but the fact that the reserves have, for the first time in several years, fallen below the legal limit is at least worthy of passing mention for what it may mean. The only importance attaching to such financial exhibits is its possible bearing on the supply of money for business requirements. A prolonged stringency would affect the course of hundreds of millions of dollars and the earning power of thousands of millions. Financiers who imagine that they are interested in rigidly restricting the volume of currency within certain narrow limits, as measured by the gold supply, argue increased stability from this present showing; but borrowing interests and business men generally, who look upon money as the representation of so much power, view with regret the evidences of scarcity. It is impossible to measure the extent of the disastrous consequences which would follow a sudden inability on the part of business interests to adjust their mutual balances by the exchange of checks. The present landed system is open to severe criticism, and, sooner or later, the whole question involved in a comprehensive and low monetary system will have to be gone over, not by lawyers, bankers or exchanging interests, but by the producing interests, and in the interests of production as contra-distinguished from exchange interests. A review of reports of railway systems for the past thirty days show a great improvement over similar reports a year ago. Vigorous economical management is visible in all departments of the railway service, and the effects are apparent in stronger confidence in the managements. Very recent information from investors, promoters and projectors of railroads is to the effect that several long lines will be undertaken next year. The announcement was made on Tuesday that the Pennsylvania had contracted for forty-five thousand tons of steel rails in Pennsylvania mills, and that there were inquiries in Eastern and Western markets for upwards of two hundred thousand tons of steel rails. All manner of iron and steel products have advanced in price in large lots at mills, and a greater volume of work than ever has presented itself since October 1. What is true of iron and steel is measurably true of a score of other industries and interests. The strong upward tendency in prices is giving confidence to the rank and file of buyers, the aggregate of whose purchases is something enormous. The extraordinary demand for machinery continues, and the improvements and new economies that are being introduced are compelling the removal of considerable old machinery and the substitution of new. Pipe-mills are crowded with orders. Western nail factories are barely able to fill jobbers' orders promptly. Prices have advanced ten per cent per keg, East and West. Beams and channels have moved up $6.72 per ton. Bridge-builders report more inquiries for bridge-work than they have had for years. Pumps for steam-users' purposes, and hydraulic machinery for mines and various other uses, are in great request.

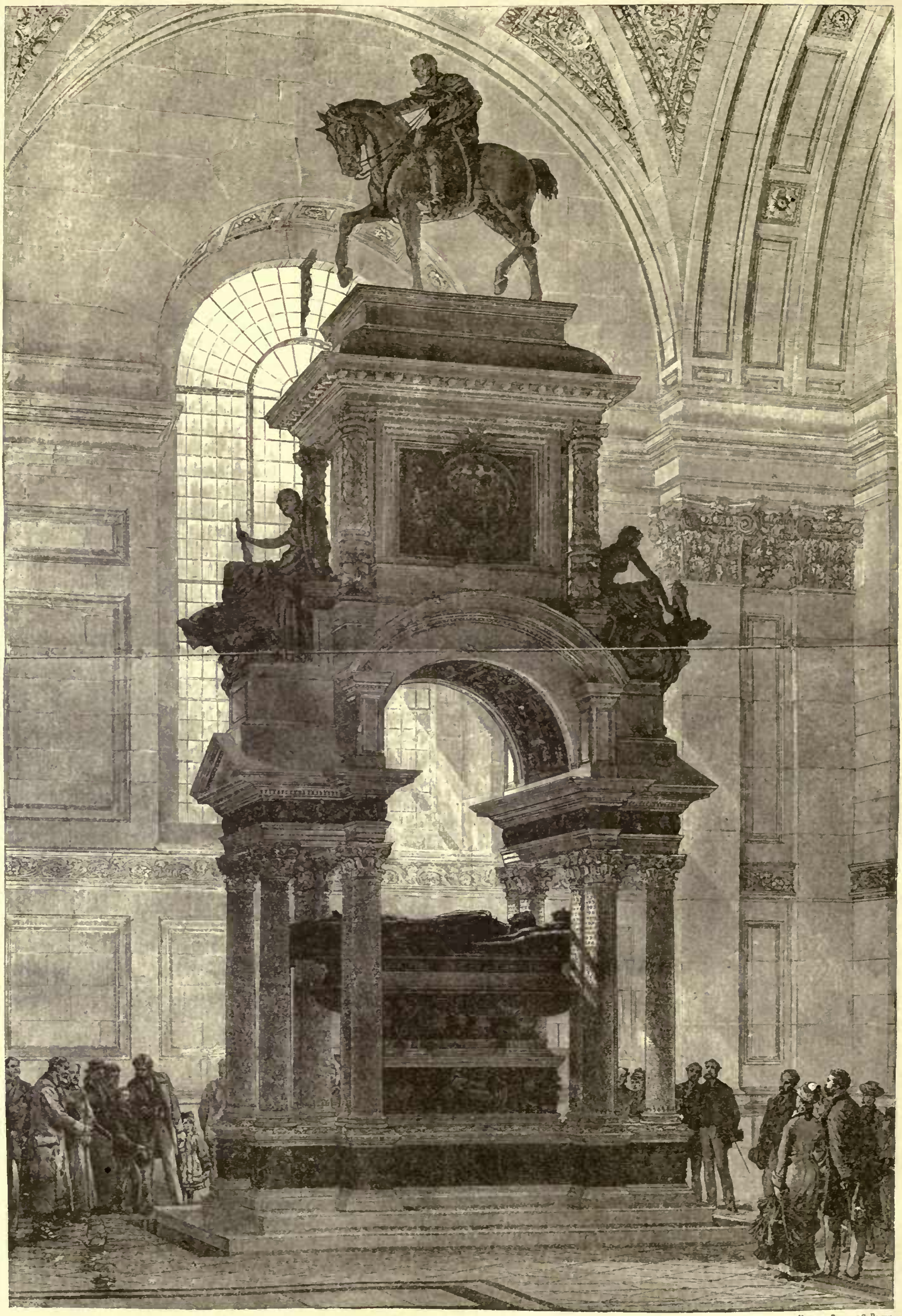
The anthracite-coal producers are 2,000,000 tons behind last year. Natural-gas developments in new fields are encouraging, but there are additional discouraging signs in Western Pennsylvania, which, of course, stimulate the efforts of those who are improving fuel-gas processes. Cost of production generally has probably reached bottom limits; manufacturers generally incline to this opinion. The only present uncertainty is as to the course of organized labor next year. The upward tendency in prices is often the occasion of apprehension and ultimately of deep regret, but the present feeling is that the steps in that direction are and will continue to be so gradual that no harm will be done to enterprise or to investors. Over four thousand new industrial enterprises have been started in the Southern States this year, against less than three thousand up to same time last year. The encouragement afforded thus far has stirred up deeper interest in Southern resources, and of late foreign investors have sent experts to report upon certain projected schemes But little difficulty is experienced in obtaining a sufficient supply of good white and even colored labor, but the percentage of blacks is much less than of whites. But few forced sales have been made this year in the South, and much of the new managing capacity is of Southern birth and training. The industrial spirit is permeating all classes, and this fact will perhaps accomplish more in the solution of semi-political problems than the best intended schemes of law-makers. Financiers, speaking for home and British investors, stated a week ago in New York that the inflow of capital to the South was only in its infancy, that ship and boat yards, railroad-building and the planting of new industrial establishments would probably set in with greater force next year. The constructors of electric-light plants and of water-works say substantially the same thing from their standpoint. Within thirty days two hundred locomotive engines have been ordered, and if present requisitions are approved of there will be orders for over five hundred additional engines and some twenty thousand freight and coal cars contracted for by December 31. The pending railroad requirements are very heavy indeed. The New England industrial conditions have improved somewhat. Hardware and hardware specialties are wanted to the full capacity of works. All electric-light machinery-makers are sold out. Paper-makers report continued activity, and capacity has been increased fully as much this year as last. Shop and factory labor is in demand. City and town real-estate is improving in value, but a more or less general depreciation of farm lands is complained of. This depreciation, which is the occasion of some unfavorable comment, will correct itself in time through an inevitable equalization of advantages of section with section. The architects in the larger cities of the New England and Middle States are of opinion that the inside winter work will be exceptionally active. The dealers in hardwoods report similarly from their standpoint, as sellers of lumber for use in such work.

S. J. PARKHILL & Co., Printers, Boston.



TOMB OF
LOUIS DE BRÉZÉ IN
ROUEN CATHEDRAL.

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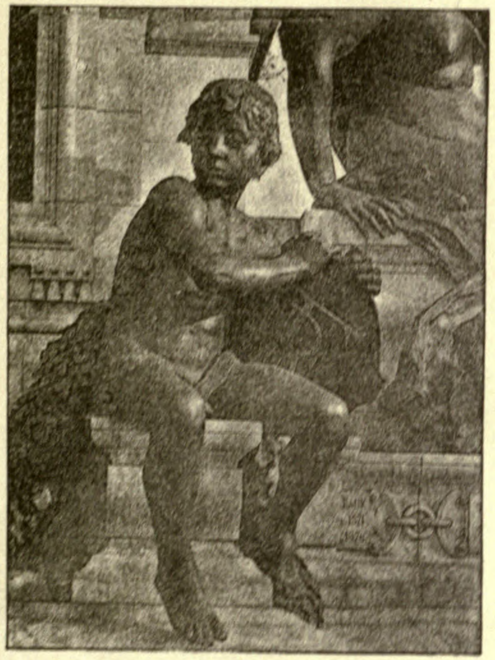
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THE WELLINGTON MONUMENT IN ST. PAUL'S CATHEDRAL.

PARIS.

L.C. BOILEAU,
ARCHITECT.









Heliotype Printing Co. Boston



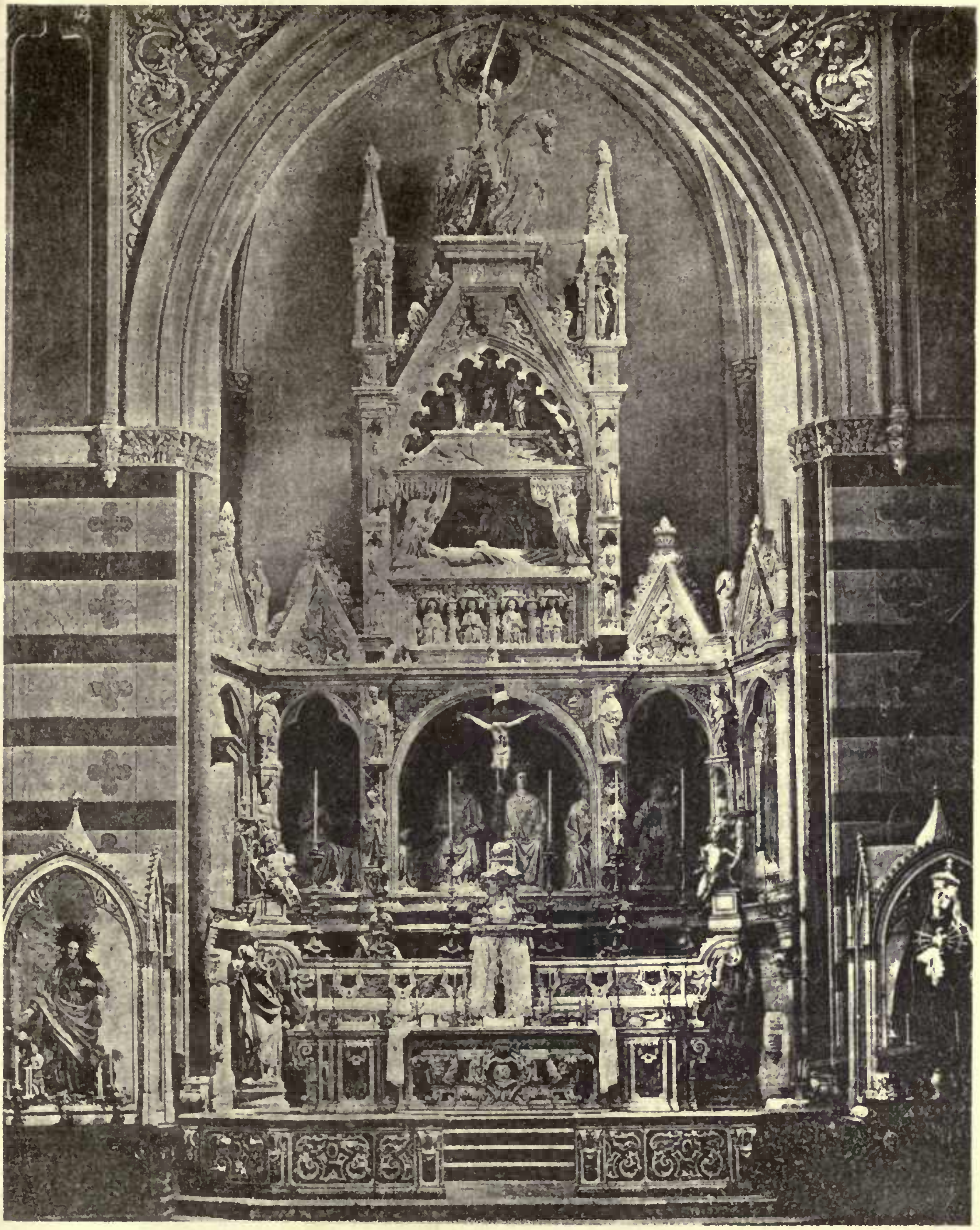






SCULPTURE, FROM THE

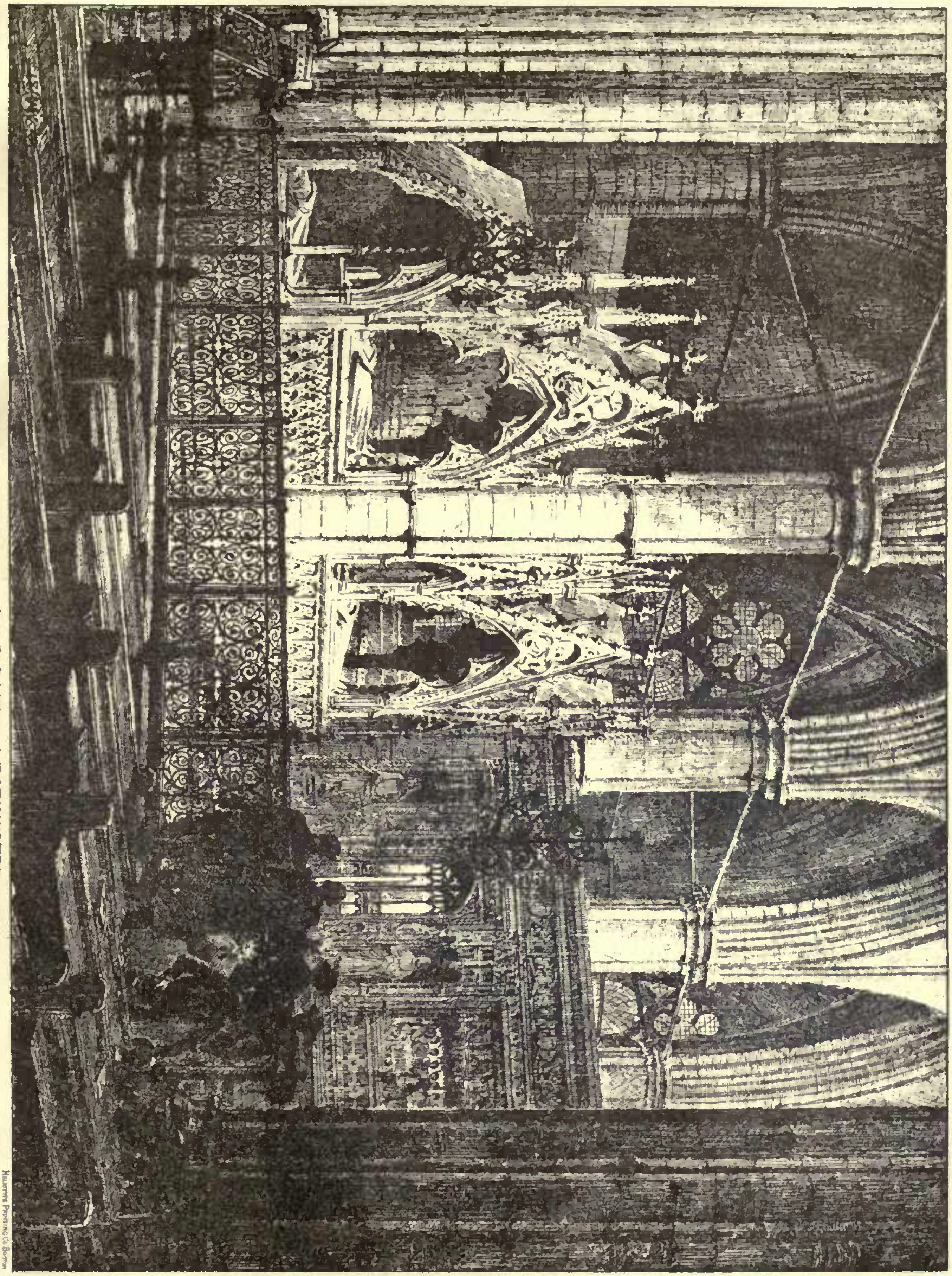
J. P. AUBE, SCULPTOR.



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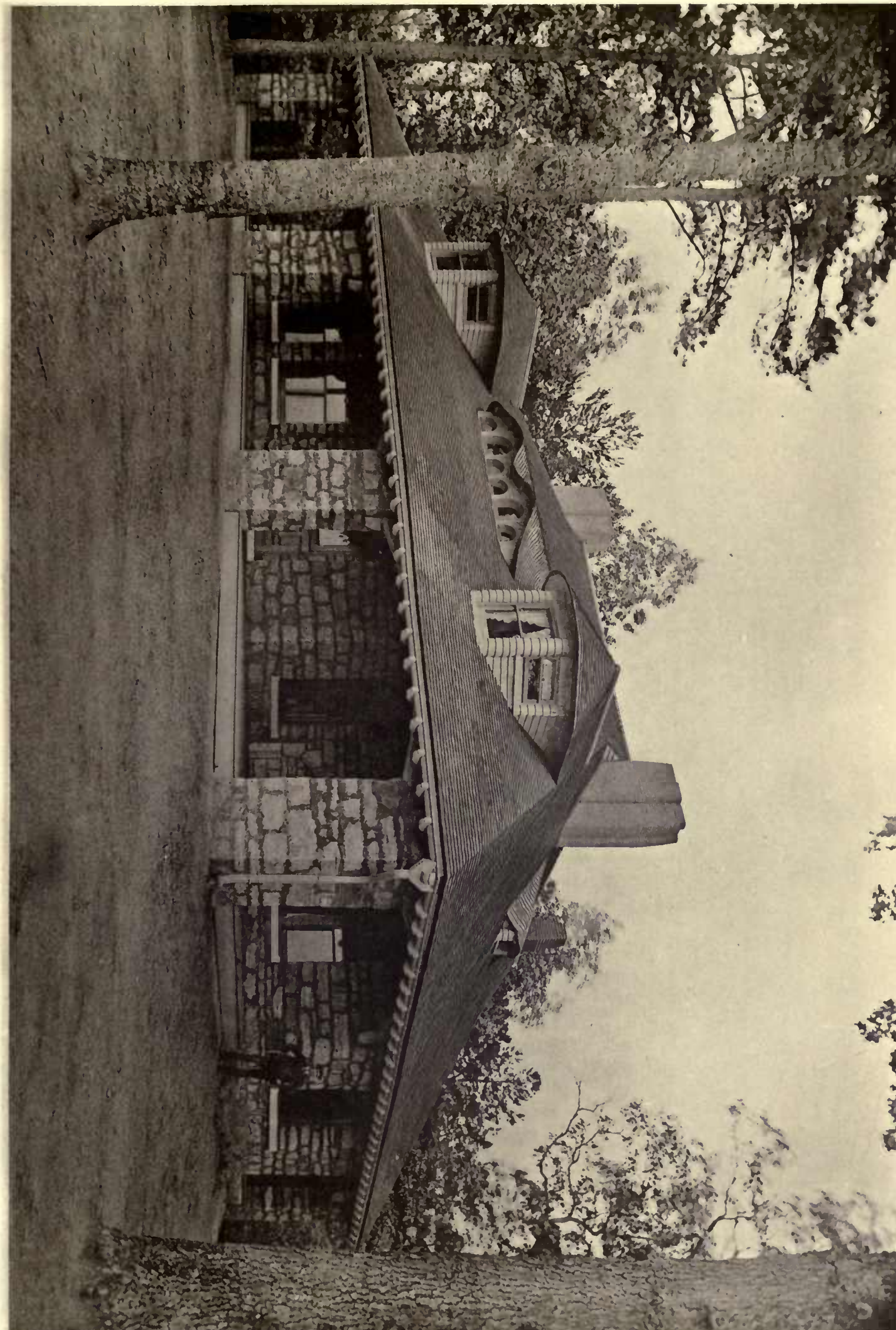
Tomb of King Ladislaus.
Naples, Italy.

AMERICAN ARCHITECT AND BUILDING NEWS. OCT 12. 1889. No. 720.



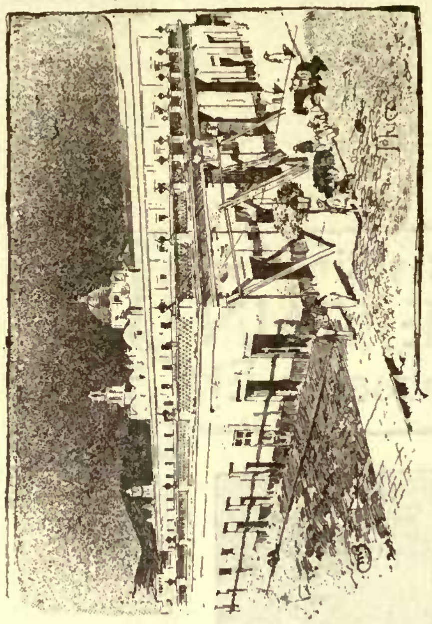
TOMBS OF DE VALENCE AND CROUCHBACK IN WESTMINSTER ABBEY.

HELIOTYPE PRINTING Co. BOSTON



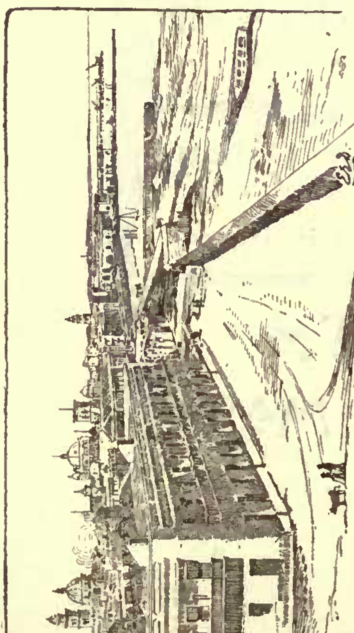
HOUSE OF FREDERICK A. BROWN, ESQ., ASHEVILLE, N. C.
HENRY RUTGERS MARSHALL, Architect.

HELIOTYPE PRINTING CO., BOSTON.

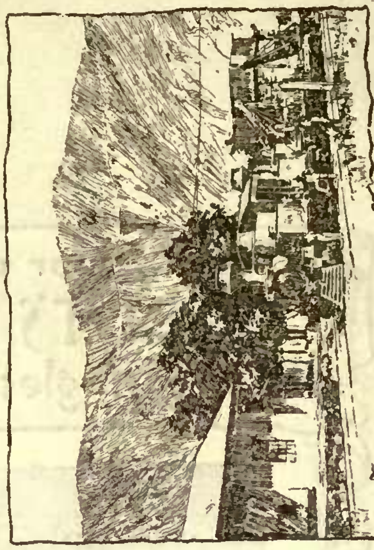


Plaza del Mercado, Toluca, Mexico.

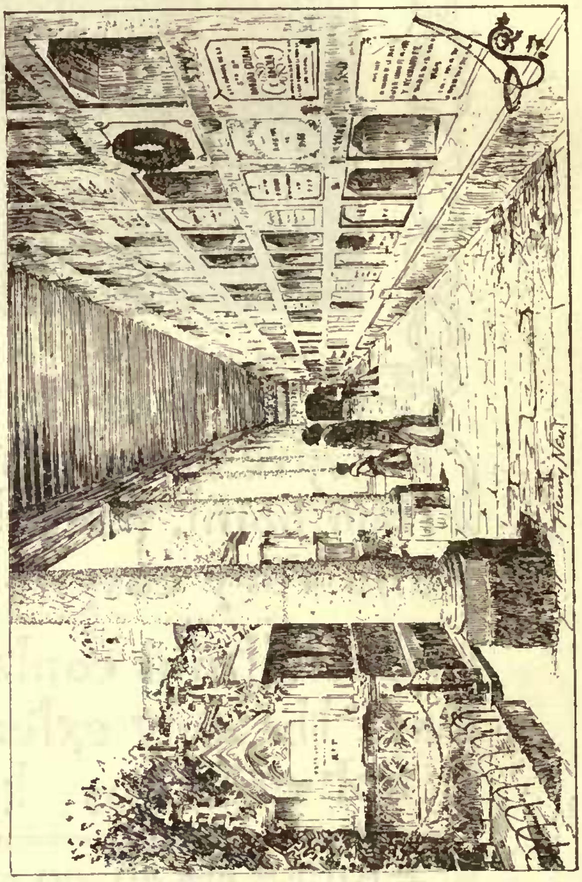




Vera Cruz.—The Sea-Wall.



Maltrata y las Cumbres, Mexico.



Panteon de San Fernando, Mexico.



MEXICAN SKETCHES.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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WE hope there is no objection, so long before the meeting of the Consolidation Convention, to the suggestion that it would be a good thing if an arrangement could be made for giving some sort of representation in the Convention to members of the two great bodies who are unable to be present in person. Judging from past experience, it is not likely that more than a tenth part of the members of the American Institute and Western Association, or, to put it in another way, a hundredth part of the architects of the country, will be at Cincinnati, and the meeting will certainly gain in authority if the other ninety-nine one-hundredths of the profession can be represented in it. It would be too late now to have the Chapters choose delegates to the Convention, as has been occasionally done, but there seems to be no reason why members of the two societies should not, like stockholders in a corporation, entrust proxies to persons in whom they have confidence, to vote for them on the important matters which will come up for consideration, or, if they preferred, to instruct them beforehand. At the next Convention, particularly, there will be many questions which ought to be immediately and definitely settled, and settled, moreover, by so decisive an expression of the opinion of the profession that the officers of the new Institute can go on with their work with a knowledge of what architects wish for, and a confidence of support from their constituents, that they have never yet had. Among these questions, the first will probably be that in regard to the permanent home of the reorganized Institute; but there are others not less important, such, for instance, as whether the new Institute shall at once, or at any definite future time, undertake the defence of its members against injustice in their professional relations with their clients or each other; whether, and in what way, steps shall be taken to secure the modification of the present system of designing the public buildings of the United States; what shall be done to prevent ignorant pretenders from stealing the business of conscientious and skilful architects, at the same time that they discredit and injure the whole profession, and so on. All these questions have come up in convention before, and have been timidly discussed, and finally disposed of with an unmeaning resolution, simply because the handful of members present did not know how far other architects would to support them in any vigorous action. Now, however, it is time and, do more than express feeble wishes on the various subjects, be done, if the profession thinks that something can and ought to it should say so emphatically before the Convention meets.

THE fifth of the interesting annual exhibitions of the New York Architectural League is to be held at 366 Fifth Avenue from Friday, December 20, 1889, to January 11, 1890. Sketches, photographs, elevations and working-drawings are admitted, as well as cartoons for decoration and stained-glass, models of architectural and decorative work, and executed pieces in mosaic, wrought-iron and other metals, wood, glass and textiles. Drawings and photographs for exhibition must be framed or mounted, and all exhibits must be delivered at the gallery on the 10th or 11th of December, nothing being received at any other time or place. In connection with the exhibition is to be held the usual annual competition for design, restricted to persons under the age of twenty-five, the prizes in which will be the gold and silver medals of the League. The subject this year is an entrance to a World's Fair. Further particulars will be found in another column or may be obtained from the Medal Committee, 47 West Forty-second Street, New York.

A MOST deplorable controversy between certain well-known architects in New York has been brought into court, and as it is, therefore, public property, there can be nothing unfriendly in referring to it. The story, in brief, is that Messrs. Lamb & Rich, the plaintiffs in the present case, suffered serious loss by a fire in their office sometime ago, and, of course, made a claim on the insurance company whose policy they held. The claim was resisted, and was referred, by agreement of both parties, to arbitration. As one of the experts on the part of the architects, Mr. A. J. Bloor, the Secretary of the American Institute of Architects, and a very prominent member of the profession in New York, was called in, and made an estimate of the value of the professional material destroyed. The claim was settled in accordance with the report of the arbitrators, and Mr. Bloor was paid for his services what Messrs. Lamb & Rich supposed to have been a perfectly satisfactory fee. By some strange misunderstanding, however, as we interpret the story, Mr. Bloor regarded himself as entitled to a much larger sum, and some time afterward demanded it. Messrs. Lamb & Rich answered, with due courtesy, that they had paid the fee agreed upon, which seemed to them a liberal one for the time devoted to the expert's work, and that they did not think that they ought to pay anything more. To this Mr. Bloor replied with an asperity which, we are bound to say, does not seem to have been justified by the circumstances, even if he sincerely believed his claim to have been a fair one, and, on the continued refusal of Messrs. Lamb & Rich to admit their indebtedness to him, he appears to have been so carried away by his feelings as to have sent out a circular-letter, addressed to architects, in which all members of the profession were warned to have nothing to do with Messrs. Lamb & Rich, and various aspersions were cast upon their character.

WE are inclined to think that few, if any, of the architects who received the circular paid any attention to it. The personal acquaintances of Messrs. Lamb & Rich would not give it a second thought, and those who did not know the high reputation of the gentlemen attacked would, we think, infer from reading the circular that it was a mere manifestation of ungovernable feeling, having probably a purely personal origin, to which no serious importance could be attached. The circular may, however, have fallen into hands where it could do more mischief than among architects, for Messrs. Lamb & Rich, after having, so far as we can see, acted with great forbearance in the matter, have at last brought an action for libel against Mr. Bloor, setting their damages at twenty thousand dollars. In the complaint, after recounting the circumstances of the original claim and the issuing of the defamatory circular, they say that they have always been ready to accept service of papers in a suit to collect the sum alleged to be due; but no such suit has ever been brought, and they naturally desire to defend themselves from aspersions based upon a claim which no attempt is made to establish. Mr. Bloor's defence, or rather, his plea in mitigation of damages, is said to be the truth of the matter contained in the circular; but if this should fail him, as it seems quite likely to do, we hope that the plaintiffs, in accepting the complete vindication which they would thereby gain, will, in conformity with the attitude of forbearance and fairness which they have hitherto maintained, consider the great and unselfish services which Mr. Bloor has rendered to the profession, and refrain from visiting too severe a penalty upon what seems to have been the hasty act of a man in delicate health, whom even a fancied grievance might be capable of exciting beyond the bounds of prudence.

M. BOUSSARD, whose opinion is entitled to a great deal of weight, disagrees entirely with the opinions expressed in M. Trélat's paper before the recent Congress of Hygiene, in regard to the desirability of porous walls for dwellings. It will be remembered that M. Trélat was very emphatic on this point, even saying that in countries where the building stone is porous, the houses are dry, wholesome and sweet, while buildings of impervious stone are damp, and full of unpleasant and noxious odors. M. Boussard, who has known cases where very unpleasant odors have penetrated from one house to another through porous walls, and who has cured the trouble by making the walls impermeable, by means of cement, thinks that M. Trélat is entirely wrong, and that walls of dwelling-houses ought to be made impervious. Even where, as in the case of exterior walls, only pure air could be drawn through from the outside, he finds that porous walls are so full of animal exhalations, condensed from the inside in their pores, to say nothing of the insects and animalculæ which live in the cavities, that the combined effluvium from all these sources seriously contaminates the air in the rooms of old houses, and he thinks that its accumulation should be prevented by using nothing but non-porous materials. A second paper is promised to *L'Architecture* on the subject, and, meanwhile, persons less expert in such matters may suspend judgment. On M. Boussard's side is the fact that in the old-fashioned hospitals, with plastered wards, the porous plastering soon became saturated with the foulest matter from the condensed emanations of the patients, and it is said that in one hospital, which had become so infected that a large part of the surgical patients died from septicæmia, the plastering of the wards was found to contain forty per cent of its weight of a sort of offensive mud, deposited from the air which had passed through its pores. It was then thought, and probably with reason, that the particles given off from this decaying mud were the cause of the blood-poisoning which had been so fatal, and for a long time after hospital walls were made of impervious materials, a lining of rough plate-glass having been agreed upon as the best of all sorts of finish for the walls of the wards. Since then, a reaction has taken place. The walls of glass, or of impervious cement, in cool weather condense the warm vapors around them into drops of very foul liquid, which trickle down to the floor, or dry away where they are, leaving in either case a volatile residuum, of very noxious quality, ready to be brushed or washed within reach of the patients. So far as the comfort of houses is concerned, there can hardly be a doubt of the superior airiness and pleasantness of porous walls, as compared with those made impervious by painting in oil, and it will be a satisfaction to be able to make up our minds definitely, from the teaching of these two learned experts, as to the comparative hygienic merits of the two sorts.

NO reader of history can have failed to be struck with the enormous political and social results which flowed from a simple scientific achievement — the invention of gunpowder. Without this beneficent explosive, the modern freedom of the common people, won from the great lords by means of the cannon which knocked their castles down about their ears, would never have been heard of, and the fire-arms of Poitiers, which terminated the hundred-years' war between France and England, made it possible thenceforth to compel kings and nobles to respect treaties, and induced them to think twice before entering into wars which offered some risk to their own precious persons, instead of involving merely the extermination of their subjects. In a somewhat similar way, according to General de Villenoisy, in *La Semaine des Constructeurs*, a single peaceful invention, that of sheet-glass, has brought about a profound change in the manners and habits of civilized nations. Except for glass windows, as he points out, a house could hardly be arranged without an inner court, the gynecæum of ancient times, or the harem of the modern Mussulmans, around which the private family rooms could be arranged, and in which the domestic operations of the household could be carried on. Even in our own time, few women would like to inhabit rooms lighted only by doors opening on the public street, and "Oriental seclusion" would be the rule of house-planning everywhere, followed by its natural consequence, the almost total separation during the daytime of the men, compelled to carry on their affairs in the bright light of the street, from the women, who, in the absence of their protectors, would shut themselves up until they became as childish as the Orientals themselves. With the introduction of glass windows, in the Middle Ages, it became possible for the artisan or merchant to carry on his business at home, and he was glad to do so; while his wife and daughters could work in the rooms over his head, protected from the weather, and from intrusion, by similar windows, which, at the same time, did not prevent them from looking into the streets, and interesting themselves in the stirring scenes which occurred so often in the cities of that period; and it can hardly be doubted that the civic enthusiasms of the tenth, eleventh and twelfth centuries, to which the world owes so much, would have been impossible if the people of the European towns had been in the habit of spending their time after the Roman fashion, in the peristyliums of houses to which the clamor of a popular tumult would only feebly penetrate.

ACCORDING to the *Sanitary News*, the Seventeenth Congress of German Physicians, which met at Brunswick in June last, adopted a formal code of ethics, which is worth the attention of other professional men besides physicians. According to this code, "Every kind of public laudation, whether it proceeds from the physician in question himself or from others, and continued advertising in public papers, are to be reprobated." Secondly, "The designation 'specialist,' for puffing purposes, is to be reprobated." Thirdly, "The public offering of medical assistance *gratis*, underbidding in concluding contracts for sick societies and the like, offering advantages of any kind to a third person in order to procure practice, are inadmissible." Fourthly, "The ordering and recommending of secret remedies are inadmissible." Fifthly, "Any attempt of any kind on the part of a physician to intrude upon the practice of another is dishonorable, especially in the case of one who has acted as substitute or in consultation. A practitioner must by no means undertake the treatment of a case without the express consent of the previous physician. A specialist called for a definite part of the treatment must strictly confine himself to that." Sixthly, "No physician is at liberty to make disparaging remarks to others about another physician."

COLONEL NORTH, the "Nitrate King," who, through a concession from the Chilian Government for working mines of nitrate of soda, is rapidly becoming one of the richest private individuals in England, is building himself a splendid house at Avery Hill, south of London, near the villa of the Empress of the French. The house contains a picture-gallery a hundred feet long, fifty feet wide and forty feet high, a ball-room hung with "thousands of yards" of crimson silk velvet, a dining-room lined with carved mahogany, and a billiard-room, the walls of which are composed of slabs of colored marble: "Numidian yellow, pink pavonazzetto and verd antique." The court from which the library is lighted has its walls faced with gold-colored tiles, and a winter-garden, a hundred feet square, from which opens a fernery, nearly half as large, serves as a place of recreation in bad weather.

PEOPLE who are old enough to remember their Thackerary pretty well may be interested to know that the renowned property known as Almack's Rooms is to be sold at auction this month, by order of the mortgagees. The entire property consists of three houses, Nos. 26, 27 and 28, King Street, but No. 26 contains the famous ball-room, the other two being ordinary mercantile buildings. Almack, the original proprietor, was a Scotchman. In 1765 he opened his new establishment, consisting of a ball-room, forty-two by ninety feet, a supper-room forty-two by forty-five feet, and two large ante-rooms, with living-rooms over them. The plans were made by Robert Mylne, and, whether from their convenient arrangement, or their tasteful decoration, the rooms soon became the scene of the most fashionable balls and assemblies in London. After the death of Almack, the buildings passed into the hands of Mr. Willis, and the rooms took his name, still continuing popular until after the death of Mr. Willis, Jr., the third successive proprietor, under whose direction the place nearly or quite completed a century of profitable existence. In 1886 the lease and furniture was bought by a stock company for two hundred and seventy-five thousand dollars, most of which was raised on mortgage, and the mortgagees have now foreclosed, although the rooms are still in use, and the location is as fashionable as ever.

SAFE BUILDING.[1] — XXXV.

CHAPTER IX. — RIVETS, RIVETING AND PINS.

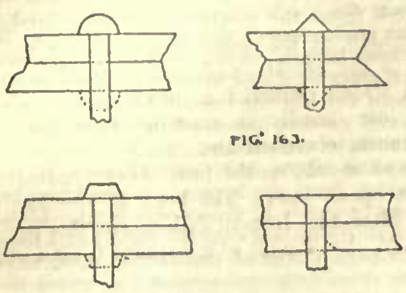


FIG. 163.

WHEN it is necessary to secure two or more pieces of iron or steel together in such a manner that they can be readily separated, bolts are used. These are iron or steel pins with solid heads at one end and threads cut on the other end, onto which the nut is screwed, thus holding the two pieces together. How close the two pieces may be held together depends, of course, entirely upon the man who handles the wrench. Then too, bolts or pins do not completely fill the holes through which they pass, which frequently is a cause of great weakness, besides the danger of water getting into the spaces and rusting them. Where, therefore, it is not necessary to ever separate the pieces — and the latter are of either wrought-iron or steel — rivets should be used, which, for all practical purposes, might be considered as permanent bolts or pins. Cast-iron, of course, always has to be bolted, as it would break if riveting were attempted on it.

Description of Rivet. A rivet is a piece of metal (wrought-iron or steel) with a solid head at one end and a long circular shank. In its shortest description the process of riveting consists in heating the rivet, passing its shank through the two (or more) holes, while hot, and then forging another solid head out of the projecting end of the shank. The hammering forces the heated shank to fill all parts of the holes, and the shank contracting in its length, as it cools, draws the heads nearer together, thus firmly forcing and holding the pieces together.

Rivets are made of mild steel or the very best wrought-iron, the latter being the most reliable. According to some writers, the shank is made tapering in length and circular in shape, being larger at the head and smaller at the end. In this country, however, the shank is always of uniform diameter.

Length of Tail. The length of shank from head to end varies with the thickness of pieces to be riveted together, but is long enough not only to allow for passing through the plates, but has also enough additional length for filling of holes and forming head, the additional length being about $2\frac{1}{2}$ times the diameter of hole. The rivets are manufactured by heating rods of the diameter of rivets, which are pushed into a machine, which at one operation forms the head and cuts off the shank to the desired length.

The shank before heating is about one-sixteenth smaller in diameter than the hole, to allow for its expansion when heated, *i. e.*, for $\frac{3}{4}''$ rivets, $\frac{13}{16}''$ holes are punched and for $\frac{7}{8}''$, $\frac{15}{16}''$ holes. There are four kinds of rivets, all answering the same uses, and only distinguishable by the shapes of their heads. These are the button or round headed rivet; the conical headed rivet; the pan or flat headed rivet; and the countersunk rivet. The latter is only used when a smooth surface is desirable. The first is the most used shape. Figure 163 shows the different shapes, the dotted lines indicating how the second head is finally shaped. Sometimes a rivet is countersunk on one end only.

The exact sizes of heads, shapes, etc., vary in different mills.

Size of Head. The diameter of head should be from $1\frac{1}{2}$ to 2 times the diameter of shank,[2] according to shape adopted and the height of head should be about $\frac{2}{3}$ the diameter of hole. In countersunk work, the head may extend entirely through the plate or not, its diameter being accordingly smaller or larger. Where it extends through the sharp edges will shear the rivet, countersinking therefore, should be avoided in the plates. In showing riveted work the diameter of the shank is always drawn and figured where the hole is to be left open and tho size of rivets is spoken of accordingly, the hole is always made $\frac{1}{16}''$ larger. Where the riveting is to be done at the shop or mills, the size of head is shown. The spacing of rivets will be considered later, the direct distance from *centre of hole to centre of hole* is known as the "*pitch.*"

Pitch of Rivets. The pitch should never be less than $2\frac{1}{2}$ diameters; nor should the centre of any hole (if possible) be nearer to any edge than $1\frac{1}{2}$ diameters. By diameters is understood the diameter of shank. In riveted angle work the distance is frequently necessarily less. In thick plates it should be more. In drilled work the pitch might be reduced to 2 diameters. If rivet-heads are countersunk the pitch should be increased, according to the amount of metal cut away to make room for the rivet-head.

In punching rivet-holes the position of holes are usually marked off on a wooden template and then through this marked or indented by a hand-punch on the iron plate; the plate is then passed under a punch which is usually worked by steam-power, th

Punching of Holes. die and the punch being adjusted to the sizo c the rivet-hole wanted, the punch is usually $\frac{1}{1}$ larger than the rivet, and the die about $\frac{1}{8}''$ larger. The thickness f plates to be punched should not, as a rule, be greater than $\frac{3}{4}$ of an in ı; nor in any case should the thickness of plate be as large as, nor larger than, the rivet-hole, as, unless the diameter of the hole is larger than the thickness of the plate the punch is apt to break. Where holes are punched at the building, small screw or hydraulic (alcohol) punches are used, which can be readily carried around by one or two men, the power being obtained by screwing or pumping; or sometimes, where mechanics are not quite up to the times, a rather more clumsy lever-punch is used, the power being obtained by increasing the direct pressure by leverage. Punching makes a ragged and irregular hole, and as it gives the plate a sudden blow or shock it injures the metal considerably, unless the rivet-holes are so close, that the entire plate is practically cold-hammered. The loss

Loss by Punching. in strength to the remaining fibres in a punched wrought-iron plate is about 15 per cent, this loss being, of course, in addition to the loss of area, and it is a loss that cannot be restored. In steel plates the remaining fibres are damaged about 33 per cent, but in them the loss can be restored by annealing the plate which, however, adds considerably to the expense.

In drilled-work there is no loss, and the holes are not only accurately located but are accurately cut. But drilled-work is very expensive, as it has to be done by hand or by machine-drills, the process being slow at best and consequently meaning a very large addition to the charge for labor. In riveted girders it would probably double the expense of the girder.

Advantages of Drilling. The advantages of drilling are, that the holes can be cut after the plates have been partially secured together, thus assuring a perfect fit of the holes over each other; and that the holes being perfectly smooth and even bear more evenly on the rivet, and the work is less apt to fail by compression, than where the bearing of plate against rivet is ragged and uneven, as in punched work. On the other hand, the edges of drilled holes are so sharp that they promote shearing, and for this reason the edges of drilled holes in plates should be filed or reamed off. As a rule, however, the architect will find the bearing and cross-breaking strengths of rivets less than their shearing, excepting where rivets are small in comparison to thickness of plates being riveted, which is not often the case.

To settle, then, whether work should be drilled or punched, is mainly a matter of expense. Drilled-work, of course, is far preferable as regards strength and it costs accordingly.

The rule of the mills is to punch all holes, excepting for countersunk rivets, which, after punching, of course, have to be drilled, to obtain the slanting sides of the hole.

A medium course between drilling and punching would be to punch the holes smaller than desired and then drill or ream them to accurate size when partially secured together.[3] Steel should always be drilled unless annealed after punching.

In most work, however, the architect will have to be satisfied with punching, and must therefore allow sufficient material to make good the damage done and to allow for inaccuracies.

Machine-Riveting. In riveting proper, that is, filling the holes, there are also the two methods of doing it, by hand (hand-riveting), or by machinery (machine-riveting), but unlike the making of the hole, in this case, the machine-work is both better and cheaper.

A machine-driven rivet is driven and completed by one powerful squeeze of the steam (or compressed-air) riveting-machine; this squeeze not only forces the plates more closely together, but more completely fills the hole with the rivet metal, besides the great advantage of doing the entire work while the rivet is hottest, and while it is, of course, at one temperature.

In hand-riveting these advantages are lost, the power being only equal to that of the mechanic's blow, and as in hand-work the process consumes some time, the rivet changes its temperature and cools considerably.

In riveting, the entire rivet, including the head, should be heated to at least a red heat. It should not be heated beyond this for fear of "burning," particularly with steel rivets. Rivets that have been heated once and allowed to cool without working should be discarded. If rivets are driven at a lower heat than a red one, they will be greatly damaged, unless riveted cold.

Hand-Riveting. In hand-riveting at least two men are required, one to hold the head, the "holder-up," the other to do the riveting; but generally there is a boy to heat and bring the rivets, one holder-up, and two riveters, whose strokes alternate and thus accelerate the process.

The riveter puts a punch or drift-pin through the holes to clear them and force them into line; the holder-up seizes the hot rivet with his pincers and puts its shank through the hole, he then covers the head with a holding-up-iron shaped to fit it, and the riveters at the other end begin hammering down the projecting end of shank. When this is roughly shaped they use an iron (called "button set," for round-headed rivets), which is properly shaped to make the head. Before beginning to hammer down the end of shank, the riveters should always thoroughly hammer the plates around the hole, to bring the plates closely together.

Hand-riveted work can sometimes be distinguished from machine-riveted work by the many marks at the made head. In machine-work there is but one mark, and this may be a little out of the

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[1] Continued from page 145, No. 718.

[2] The Franklin Institute standard for button-heads (which are usually us d in the United States) is to make the head $\frac{1}{8}''$ larger in diameter than $1\frac{1}{2}$ times the diameter of shank.

[3] If this is not done the "drift pin" will be nsed to force all the holes into line, d this means crushing and possibly buckling of the plates.

centre with the shank and so show the squeezed material around its edge. But usually the work cannot be distinguished in this way. If hand-riveting has been conscientiously done and by careful mechanics, it is difficult to distinguish it from machine-riveting. But the shanks of hand-riveted work, as a rule, do not fill the hole as well as those in machine-riveted work, and they can more easily be "backed out" after the head has been cut off with a chisel and hammer. The only reliable test in both methods is to hold the hand one side of the head and strike the other side with a light hammer—the hammer test—when the sound will quickly disclose loose shanks. If in machine-riveting the plate has been sprung, and the pressure is quickly removed while the rivet is still hot, the plate may settle back, lift the hot head, and so form a loose shank.

How to Distinguish Riveting.

In designing riveted work, whether to be hand or machine riveted, the architect should bear in mind the necessity of placing the rivets so that they can be inserted in the holes from one side and hammered from the other, and for machine-work, that the machine can reach them.[1]

Steel rivets damaged.

Steel rivets are very seriously damaged during the process of riveting. Box gives as the average of a number of tests of bar steel a tensional-strength of 47,84 tons (gross), which, after riveting, was equal in shearing-strength to only 23,77 tons (gross), a loss of 50 per cent as between the tensional-strength of the steel and shearing-strength of the riveted work, whereas in ordinary steel work this loss never exceeds 33⅓ per cent, as between tension and shearing.

In wrought-iron the loss is about 15 per cent. In steel the strength of the rivets will depend greatly upon the composition and nature of the steel itself, but in order to be able to rivet, the steel will necessarily have to be of a mild character. The safe values given in Table IV, for compression and shearing of wrought-iron and steel, can therefore be used with perfect safety.

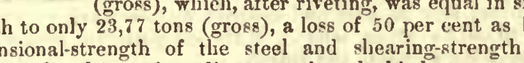
Use larger modulus of rupture.

When calculating bending-moments on rivets, a modulus of rupture 25 per cent greater than given in Table IV may be used, as the rivet-heads answer the same purpose as nuts and heads on pins in holding together the plates which are pulling in opposite directions, and thus reducing the bending-moment by friction. In figuring the number of rivets required an architect should err on the side of liberality, rather than to stint them, as there will necessarily be more or less of them poorly driven. He should particularly do this where strains are small and the number of rivets required are few, as one weak rivet in a small lot would quickly diminish the factor-of-safety, where in a large lot it would scarcely vary it appreciably.

Chain, zig-zag or staggered.

Of course the more rivets there are, the more will the plates be injured and cut away; this loss, however, can be largely overcome by what is called "chain-riveting," or "zig-zag" riveting, and by making the laps or cover-plates pointed.

Chain riveting consists of placing the alternate rivets on different lines instead of all on one line, see Figure 164. This again is called

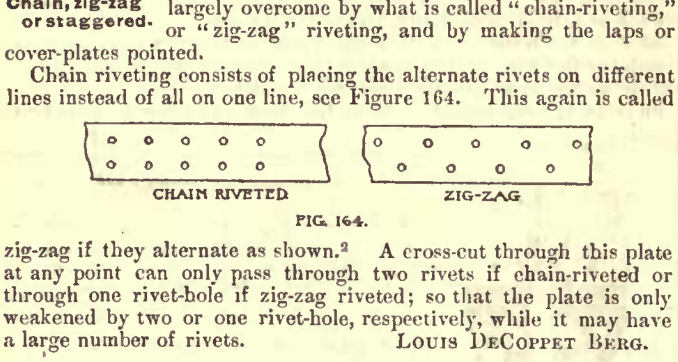


CHAIN RIVETED ZIG-ZAG

FIG. 164.

zig-zag if they alternate as shown.[2] A cross-cut through this plate at any point can only pass through two rivets if chain-riveted or through one rivet-hole if zig-zag riveted; so that the plate is only weakened by two or one rivet-hole, respectively, while it may have a large number of rivets. LOUIS DECOPPET BERG.

[To be continued.]



THE CONVENTION OF THE AMERICAN INSTITUTE OF MINING ENGINEERS AT OTTAWA.—THE MINERAL WEALTH OF THE DOMINION.—EXEMPTION OF CATHOLIC PROPERTY FROM TAXATION.—THE GREAT DRY-DOCK AT HALIFAX.—THE FORMATION OF LEGAL PRECEDENTS.

THE American Institute of Mining Engineers assembled early this month for their seventeenth annual meeting in our capital city, Ottawa. This Institute was formed in Wilkes-Barre, Pa., in 1871, with twenty-two members, who have now increased to over a thousand. The visit to Ottawa is of unusual importance at the present time, for the whole country round Ottawa is known to be rich in minerals, but up to the present little has been done towards mining them. In the districts round Buckingham and Templeton there are valuable phosphates and mica, tracts of iron and traces of gold, quartz and galena. About the neighborhood of Temiscamingue mines are in work for the production of galena, and through the tracts of Sudbury and Mattawa mineral deposits of all kinds are continually being found. Even precious stones are not wanting in this rich country; in the Gatineau districts the beautiful stone known as "steria" has been found, and garnets imbedded in "garnetiferous gneiss" have been found almost on the surface.

There is something curious about this garnetiferous gneiss. Mica, quartz and garnet come from the hypozoic or metamorphic formation, the lowest but one (granite) in the earth's crust. Mica-schist, quartz and garnets are constituents of the rock, but I have myself found the garnet in huge blocks of the hardest rock, miles away from any bed of the same rock, and several feet above the nearest river, perfectly rounded and smoothed as if by the action of water, which must have taken untold years to produce the existing surface. This garnetiferous gneiss is so hard as to be almost unbreakable, except by blasting, and the blocks I refer to must have weighed between three and four tons each.

The Government lent the rooms of the Railway Committee in the Parliament Buildings for the use of the Institute during their stay in the city; the opening meeting was held on the 2d ult., Sir John A. Macdonald, Premier, and other Ministers being present. Sir John was called upon for a few words, and he responded to the call with one of his amusing speeches, in which he heartily welcomed the visitors. He said he was glad to find that Americans were losing the idea that Canada was a region of ice and snow, and although he was very glad of the amicable relations existing between the two countries, some of his political friends who had crossed the border told him that the Americans were getting rather too affectionate. He hoped that with the assistance of the mining engineers Canada would be able to follow Sheridan's advice: "Dam your rivers, sink your mines and blast your canals." Over two hundred new members, several being Canadians, were enrolled.

The very fine Geological Museum in Ottawa, under Government management, was naturally one of the chief attractions to the mining engineers, and a great deal of time was spent by the visitors in examining the collections. The museum is kept in the most perfect order, and the minerals are arranged and classified, so that at a glance a fair estimate may be formed of Canada's mineral wealth, though an investigation of the numerous cases, in anything like a complete manner, is a labor not easily disposed of. Mr. Eggleston, of New York, who spent a morning looking at the iron ores, was astonished to find how low they are in phosphorous and sulphur, and how very high in iron; and he was sure that many an American company would be glad of the opportunity of mining them, if they only knew the qualities of the ores.

Professor Hardman, of Oldham, N. S., delivered an address on the gold-mining of Nova Scotia. He said that twenty gold districts of the province are being worked, and the average return derived from each ton of quartz mined was fifteen dollars. Nova Scotia gold is of very high value, ranging as high as twenty dollars an ounce. Improved methods of mining were being rapidly introduced, and this year six, if not eight districts, would each produce forty thousand dollars worth of gold. Splendid specimens of gold-bearing quartz were exhibited from the Montague mine, Nova Scotia. Papers were read on the "Phosphate Industry of Ottawa County," and on the "Copper Company's Works at Sudbury."

Resolution of thanks to the Dominion, Ontario and Quebec Governments and to the Local Reception Committee were passed, and it was decided to present Sir John A. Macdonald with a bound set of the transactions, as a mark of the Institute's appreciation of his kindness.

No more suitable place than the Railway Committee's rooms could have been obtained for the purposes of these meetings. Besides being spacious, well-lighted and furnished, the walls of the rooms are hung with very beautiful specimens of map-drawing—maps of the whole Dominion most acurately and carefully prepared; in fact, they may be regarded quite as works of art.

A great outcry is being made in Montreal in the matter of taxation. Large areas in the possession of the Roman Catholics being exempted from taxation, valued now at not less than nineteen millions of dollars. I believe the most valuable of this free property is held by the order of the Grey Nuns, an unusually wealthy sisterhood, in the heart of the city, now covered by fine warehouses of very pretentious aspect, bringing in a very considerable rental. It is all very well to exempt their collegiate institutions, churches, nunneries, monasteries and such buildings, if that is the rule, but when they cover exempted land with purely business blocks, they certainly should be made to pay their share of the taxes.

Montreal is trying to keep pace with the advanced civilization of the times, and has lately been lighted from end to end with electric-light; unfortunately, the lamps have not proved sufficient, and assistance has been received from the gas companies. Until recently, the whole area of the city and suburbs have been illuminated with 2,379 gas lamps and 671 coal-oil lamps. The attempt was made to substitute for these 753 arc and 346 incandescent electric-lights, but this total of 1,099 has proved insufficient.

[1] The minimum distance, from inside face of one leg of an angle-iron to centre of *nearest* rivet-hole, in other leg, should be at least 1¼″ for 1″ diameter rivet; 1⅛″ for ⅞″ diameter rivet; 1″ for ¾″ diameter rivet; ⅞″ for ⅝″ diameter rivet; 13-16″ for ½″ diameter rivet: and if possible these distances should be increased.

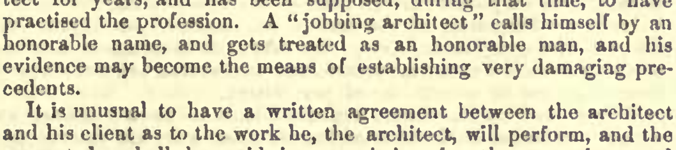
[2] Most mills use the term "staggered" in place of "zig-zag," but for convenience in writing the writer prefers to use the term staggered to mean zig-zag rivets placed pyramidically.

There seem to be two parties in Montreal: one fond of music and the other dead to its charms. The first of these is exhibiting its musical propensities by building a new organ, double the size of the old one, in the great parish church of Nôtre Dame, at a cost of $35,000, with seventy-five stops. The other party has had a tax of $50 put on every barrel or other street organ, the playing of which, being found a very profitable employment, has become a perfect nuisance to these fastidious folk.

Halifax, Nova Scotia, our summer Atlantic port, has recently risen to be a city of far greater importance than it has hitherto possessed, not only in the Dominion, but in the empire. It has always been rather a gay little place, on account of the military establishment and the occasional visits of the cruising squadrons of the Atlantic. But now it has become the headquarters of the British Atlantic squadron. The great dock at Bermuda, constructed for the use of the Imperial Navy, has become almost obsolete, and a new dock has been built at Halifax, to take its place, at a cost of nearly $10,000,000, capable of holding the largest vessel afloat, or likely to be afloat for years to come. The works have been subsidized to the extent of $600,000 by the Dominion and Imperial Governments, and the city of Halifax. The dock has been partly blasted out of the solid rock, and measures 600 feet long, 70 feet wide at the bottom, and 100 feet wide at the coping. It has an extreme working length of 568 feet, and the depth of water, at high water, over the sills, is 30 feet. The pumping arrangements for emptying the dock are very complete, and the capacity is 38,000 feet per minute, which empties the dock in less than four hours. Ample space is provided for the discharge or loading of cargoes on quays, which have an area of 90,000 square feet. The floor of the dock is of concrete 2 feet 6 inches thick on the solid rock, and where masonry has been required, it has been constructed of granite from 3 feet to 5 feet thick. Halifax, as a shipping port, now ranks third on this continent, being next to New York and Boston, and its importance to the empire can hardly be over-estimated. It was opened on September 19, by Vice-admiral Watson, with the docking of the warship "*Canada*."

A very serious matter, and one well worth the attention of all architects throughout the world, is the "formation of precedents" in suits at law between architects and their clients, or contractors. The majority of suits of the kind are brought by "jobbing architects," men who do not scruple to do a dirty thing to secure their own ends, and the evidence produced by them is often unprofessional in the extreme; or else it is the client of little status who brings forward these "jobbing architects" as witnesses in his behalf against an architect of standing, and too often a judge, unaccustomed to professional customs of architects, makes a ruling that he would not have given had he been properly informed. It is not within the duties of a judge to assure himself personally as to the real standing or ability of the witness who has called himself an architect for years, and has been supposed, during that time, to have practised the profession. A "jobbing architect" calls himself by an honorable name, and gets treated as an honorable man, and his evidence may become the means of establishing very damaging precedents.

It is unusual to have a written agreement between the architect and his client as to the work he, the architect, will perform, and the amount he shall be paid in commission for these services, and through either the failure of the architect to mention at the outset that he has to charge for such and such particulars in addition to the 5 per cent commission, or through the forgetfulness of the client who "does not remember anything of the kind being mentioned," actions arise which a judge can only decide upon the facts produced. Architectural societies ought to take this matter up, and form committees to deal with cases as they come up, to save themselves and their brethren from the damaging evidence of erroneous precedents.



HOTEL BUILDING. — THE GROWING USE OF COLOR IN BUILDING. — THE AUSTRALIAN INSTITUTE OF ARCHITECTS.

MISERABLE hotel accommodation has hitherto been the chief grievance with visitors to Sydney, and truly they had warrant enough for their complaint. But we are going to alter all that. A large coffee palace was opened during the week; a larger one is almost completed, and the Australia Hotel, capable of accommodating some 300 guests, is in course of erection.

The theatrical author in the comedy of "*The Critic*" complained that when he gave his subordinates a good idea they generally worked it to death, and this has ever been the way here. Some speculator more enterprising or more far-sighted than the rest leads, and the others blindly follow. A year or so ago the building of arcades — we have seven or eight of them — after the fashion of the Galleria Vittorio Emanuele, at Milan, was the prevailing form of speculative fever; now when half these have proved financial failures, hotel-building seems to be the next stage of infection.

The Australia Hotel proprietary intend spending about £250,000 sterling on their venture, and wisely thought it worth their while to send Mr. Ralph Mansfield, of the firm of Mansfield Bros., architects, to America for the purpose of inspecting and procuring particulars of the leading hotels in the United States. The result is shown in the planning which is undoubtedly good, but much cannot be said of the external treatment. It will be perhaps a couple of stories taller than most of our buildings, and that is all. This is less excusable, because it is understood that the architects received *carte blanche* in the matter of design — a thing I should think of rare occurrence anywhere, but most of all in Sydney. So that without being hypercritical one may reasonably feel dissatisfied when the senior architects of the city with ample funds at their disposal, and with the added advantage of American experience produce such a lifeless and utterly commonplace composition as their published design for the building under notice.

Our Institute of Architects now numbers about seventy members, and lately we have had under discussion the question of affiliation with the Royal Institute of British Architects. If this can be brought about it will do much towards raising the status of the profession. We can congratulate ourselves on now having a President, in Mr. Horbury Hunt, who is both energetic in promoting the interests of the Institute and fearless in his denunciation of anything verging on the unprofessional.

Of Mr. Hunt's architectural work I may have occasion hereafter to speak, but here let me say that though sometimes it is not altogether pleasing, it is invariably thoughtful, and characteristic enough to make it distinguished anywhere. He has the honor, too, of being the author of the first really successful attempt in the introduction of polychromatic architecture here. I allude to Framer's drapery establishment in Pitt Street. Any one with a vestige of artistic feeling passing down that "long unlovely street" cannot but feel grateful to the man who produced that charming bit of color, hemmed in as it now is, by vast piles of sad-hued stucco.

The days of *colorless* architecture, however, seem to be drawing to a close, for, if one can judge from the number of red brick and tiled buildings springing up about the city, it would seem as if there was a growing feeling for something other than plastered walls, though our brickwork is almost always colored, and consequently garnish, and our tiles are unpleasantly raw in tone. A brick church, faced with Italian marbles and Venetian glass mosaic, is also being erected in one of the suburbs — the first building of its kind, I believe, in Australia. It is, however, rather a bold step — even when his clients are indulgent — for an architect to make a departure like this in a new country, where his work will certainly be misunderstood and, in all probability, laughed at by nine-tenths of those who criticise it. Hence it is that our finest buildings are often treated with indifference, while a costly vulgar mass of misapplied detail — such as the new banking premises for the Australian Joint Stock Bank in George Street — elicits the most extravagant commendation.



THE EXHIBITS OF FOREIGN COUNTRIES. — THE FACADES OF THE FOREIGN SECTIONS. — THE BEST ILLUSTRATED RECORD OF THE EXHIBITION.

THE foreign industrial sections occupy in the Palais du Champ de Mars a total area of 24,166 square metres, divided between two wings on either side of the garden, and divided in the following manner:

England and her colonies, 5,145.50 square metres.

Belgium	3,875.65.
Low Countries	1,187.60.
Denmark	417.65.
Austro-Hungary	2,291.00.
United States	3,125.00.
Russia	1,875.00.
Switzerland	1,652.50.
Norway	937.50.
Luxemburg	208.35.
Roumania	416.65.
Portugal	521.00.
Spain	1,041.66.

Independently of the spaces reserved to industrial productions, several of these countries exhibit in their special pavilions, or in the galleries on the quays, their agricultural products. Portugal and Spain and many others are represented by special constructions, which we shall have occasion to examine later. The United States,

we see, occupies at the exhibition an important place, but on visiting the different specimens of their industries one regrets that this space was not larger. I do not intend to speak at length here of all these products, which you know far better than we. I wish simply to bear testimony to the success obtained in this section by the special skill of the American people, which applies in so practical a manner to all its needs that ingenuity which attracts us — an ingenuity which is, unfortunately, repressed in this country by a spirit of routine which we have the greatest difficulty to escape from.

There is always a crowd about the type-writing machines, the phonograph and graphophone, that acme of scientific curiosity which is on the threshold of transmogrifying the ordinary process of rapid correspondence. I suppose there is no need in an American journal to explain this apparatus, with which the phonographer's art has become a simple process, easily accessible to the greatest number of people.

The ingenuity of the practical and comfortable side becomes almost excessive in certain specimens of furniture which the United States have sent to the exhibition. I will take as an example the Derby roll-top desk. All the parts of this bit of furniture draw out, push in, slip away, rise up or disappear in order to form drawers or pigeon-holes. It is extremely ingenious and amusing, but really it is such an exaggeration! and that which I particularly criticise is that certain forms of construction, such as consoles which seem to support pigeon-holes, are used only to conceal still more drawers. The exhibits sent by Mr. Cutler, although very interesting, deserve the same reproach of being too complicated, at least in my opinion. In a very different manner, a very curious exhibition is that of the petrified wood from Arizona, which the Drake Company, of St. Paul and Sioux Falls, South Dakota, make. These woods are transformed into stone of great hardness, and are able to receive polish like marble, so that they exhibit the greatest variety of beautiful colors. The exhibits of the United States also include among the most interesting products the porcelain and glass-ware of Davis Collamore, and the very beautiful silver-work of the Gorham Company; among other things, their massive silver vase designed in honor of the Centennial of Independence. Finally, the diamonds and jewels shown by Tiffany have the full success which they deserve by their richness and good taste.

We see little to mention in the sections of the countries which have sent in great part merely raw products: such are Portugal, amongst whose exhibits we shall find, nevertheless, beautiful faience and the ware made at Vista Alegre; Roumania, who shows specimens of stoves made by the Basalt Society at Bucharest; Switzerland, which shines particularly by reason of the marvellous clock-making of Geneva; Belgium and Luxemburg. England will arrest our attention longer, first, by the different specimens of wares sent by Doulton, who, side by side with his drain-pipe, of the most practical use in connection with the carriage of water or the water-closet, exhibits very interesting ceramic work and chimneypieces in marble and tile, very artistically combined. Several *motifs* in ceramics are quite remarkable, and can hold their own with the most beautiful faience. We can note, amongst other things, a peacock in the midst of leafage, which makes a fragment of much richness.

Without stopping longer before the porcelain and pottery for table use, although interesting enough, but not having any connection with the subjects which we have to consider more particularly here, we will examine some specimens, by far too few in number, of English furniture. Messrs. Roberts & Edwards, of London, show, among other things, an *étagère* chimneypiece, a little too tormented, perhaps, but fine and elegant, and especially very decorative. The conception is original, and ought to be adopted in France, especially with the prevailing mode, which suppresses the decorations of the mantel-shelf and the mantel-clock to replace them with statuettes and small objects of art, which would very naturally find a place in the glazed compartments of the English chimneypiece. By the side of this can be seen very pretty credences and fine clock-cases of carved wood. In contrast with this delicate work, a piece of furniture sent by Frank Gilles, elaborated with much care, but much more robust in form, attracts much attention, and that is all. It is very little for an industry which, in England, has so great importance.

Belgium draws attention to itself (I speak always from the point-of-view which interests us) by the beautiful exhibit of glass from Jumet and Hainaut, which rival in grandeur and purity the beautiful glass made at St. Gobain. The faience work of Boch, of Keramis-la-Louvières, is very interesting. Commonly used like cameos, some have a fascinating charm and a distinguished and discreet decorative effect. Finally, the Maison Goyer & Frères, of Louvain, exhibit in the midst of the furniture some pieces without much originality, but of careful workmanship, one quite pretty monumental mantelpiece in stone imitated in plaster, of superb richness and good taste.

We shall find nothing to mention in the exhibits of Austro-Hungary, which makes a specialty of showing china table-ware, the Bohemian glass-work and, in general, a collection of bric-à-brac, which is often interesting enough, always rich, sometimes entirely satisfactory from the artistic point-of-view; but for the greater part of the time the search after decorative and color effects, pushed to the extreme, leads only to confusion and false glitter.

Russian industrial art is hardly represented. The same may be said of Norway, amongst whose exhibits we see only a few interesting models of wooden construction and a very curious exhibit of ancient jewelry by Hammer, of Christiania. In Spain and Italy, on the contrary, we encounter a great profusion of furniture, faience and mosaic, besides a quantity of sculpture of the kind so common in Italy — those dainty terra-cotta figures which represent a fantastic kind of humor, of inferior merit as art, but often very amusing. The Italian section is full of these little old men and women laughing to rend the sides, or with slightly flippant scenes, which, with a certain class, have a considerable success. At the side of this art of low degree are some marble sculptures which evidence a real talent — delicate, gracious, a little roguish, but, after all, very agreeable. Children play a considerable rôle in this very Italian kind of art: laughing boys with caps cocked on the side of the head, or with a cigarette between the lips; boys and girls conversing, but all being modelled after life give an impression of movement and the gayety of the street.

The furniture of the Italian section does not possess much interest. The pieces are generally imitated after our own, but with a superabundance of detail, sculpture and decoration absolutely bad in taste, and which in certain cases — in that of a seat, for instance — makes the ordinary use of it absolutely impossible, or, at least, extremely inconvenient.

The Stabilimento Quartara deserves more particular attention for the cabinet of natural pear-wood, very richly carved, and showing much cunning of hand in the execution. One of the glories of Italian industry has in all times been mosaic-work. Among the most beautiful specimens of this art, so closely connected with architecture, there must be particularly mentioned those exhibited by Salviati, of Venice, which possess great richness and admirable brilliancy, and recall the magnificent Byzantine mosaics, and also those of the Association of Murano. This association presents an interesting application of glass in the form of a bit of parquetry executed for His Highness, the Maharajah Gaickwar of Baroda. It is a combination of enamel with hard stone, which very pleasingly completes the decorative effect of the mosaic.

All these different foreign sections open on the broad vestibules, and have their façades on these vestibules treated in their several national styles. Some are very successful. Chief amongst these is that of Norway, entirely in wood, and built after the fashion of the country. The Russian façade reproduces *motifs* from the Kremlin, a *silhouette* of which, as shown in the decorative background, is very curious. England has been less happily represented by a portico in the English Renaissance style, very dry, and without either outline or color. Besides, this section, it must be said, is one of those which are remarkable by reason of the bad taste in the general decoration, which has a tonality which is absolutely excruciating. Switzerland, on the contrary, whose façade is of wood, very simple in character, presents a brilliant aspect, obtained simply by certain red fillets and chamfers, which detach themselves from a white background. Finally, Italy also adopted, as did England, the scheme of a portico opening on the vestibule; but here the intercolumniations, with the heavily-moulded pointed arches resting on twisted columns decorated in mosaic in the style of the Italian Renaissance, are elegant and fine, and the whole has a very pretty effect. The meagreness of the mosaic decoration might be pointed out as a defect, since this really demands large surfaces for its proper display.

Before finishing this letter, I would like to speak of a publication which is of indisputable interest for all those who, not having seen the exhibition, would like to have an exact and conscientious idea of what it really was. Paris is flooded with guides, with reviews and gazettes and bulletins, more or less serious and well-informed. Among all these publications, there is one which particularly recommends itself to artists and the better-instructed who desire to preserve a real record of the exhibition. This is the "*Revue Illustré de l'Exposition*,"[1] by MM. F. G. Dumas, director, and Fourcand, editor-in-chief, written by our best writers and illustrated by our most successful artists. It will treat, in twenty-four parts at least, the artistic, anecdotic and industrial sides of the exhibition. It will show photographically Paris and the Champs de Mars during these six months of *fête*, on every side and in all their aspects. It is a work at once literary and artistic.

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF ROGER WOLCOTT, ESQ., MILTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Heliochrome, issued only with the Imperial Edition.]

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. R. W. GIBSON, ARCHITECT, NEW YORK, N. Y.

[Issued only with the Imperial Edition.]

THIS design was an effort to continue the series of great cathedrals of the world. It was not to be an imitation of any of them, but a development. The style is English Gothic of the Fourth or Decorated Period. There is no great cathedral in this style. Portions of York and Lincoln furnish examples of it. It was

[1] Printed by Motteroz: Rue Bonaparte. Price, 40 francs.

intended to use it without servility, and to retain the simplicity of motive and directness of purpose which characterize somewhat earlier work. The columns and shafts would be of less slender proportions than in English prototypes. Deep arch mouldings of circular origin would be used in clearly-defined groups or orders. Capitals would all be carved in conventionalized forms of known plants and things, all carvings representing some symbolism or story. The abacus is always round, the traceries all flowing. In short, the style is a revised English Decorated, in which an earlier dignity and massiveness is retained. The composition is not very different from that of the ancient examples. It was purposed to plan this building untrammelled by any obsolete rules, yet, as the work developed, it became more and more like the old. Commencing with a wide nave and narrow aisles for congregational use, the wide side-aisles were added for the reception of statues and monuments, and the narrow aisles became memorial chapels. A central dome was contemplated, but it seemed to the author incompatible with the perspective effects of a Gothic building. While it is true that a domed hall affords as noble a motive as could be desired, yet it evidently demands that every other should be subordinated to it. The rectangular plan was adopted in the belief that the preferences of churchmen were distinctively toward conservatism, and the traditional arrangement, when carried out on such a scale as here contemplated, affords all the accommodation required: the pillars of the crossing, for example, stand upon a circle whose diameter is 90 feet; this space, with the adjacent first bays of nave and transepts, are equal to the comfortable accommodation of 2,000 people. The remainder of the nave and transepts and the aisles are chiefly for monumental effect and for occasional crowds. These parts were, therefore, not considered as they are in an ordinary church. Although a vast congregation may be gathered in them occasionally, this is not their only — not even their chief — purpose.

In designing a cathedral, it was held that the study of a suitable precedent was a first duty. Cologne is one of the most prominent types, but it is admittedly faulty in one respect: its nave is too narrow for its height. In New York we want spaciousness as well as height. Milan and Seville are fine examples of wide naves. Their width with the height of Cologne would be magnificent. The proportions of Westminster Abbey are superb.

They afford many suggestions for this design, which is of far nobler size. These, then, are the key-notes of the composition:

A nave wide as Milan, with the perfect proportions of Westminster; Cologne with its height retained, but other dimensions adjusted to it; and for necessary dignity in a city of immensely lofty buildings, a central spire 575 feet high was contemplated.

The general dimensions, as compared with those of existing buildings, are shown approximately in the following table:

CATHEDRAL.	Length internal in use.	Width Nave, Centre of Cols.	Width Nave and Aisles.	Height Nave Vault.
Canterbury	375	35	72	78
York	416	52	106	93
Salisbury	450	39	78	76
Norwich	390	36	70	72
Winchester	400	42	88	77
Litchfield	379	33	65	54
Wells	310	37	68	66
Exeter	302	39	72	66
Worcester	335	39	79	67
Peterboro	400	42	79	73
Gloucester	304	41	86	67
St. Paul's, London	460	55	94	90
Roman Catholic, N. Y.	306	48	96	108
Milan	475	63	186	

CATHEDRAL.	Length in clear including apse, etc.	Width Nave, Centre of Cols.	Width Nave and Aisles.	Height Nave Vault.
Cologne	405	44	130	155
Paris	403	48	110	
Bourges	370	49	128	115
Troyes	395	50	124	
Chartres	430	50	100	
Amiens	435	49	100	
Rheims	430	48	95	
Lincoln	468	45	80	
York	486	52	106	
Westminster	505	38	75	
Burgos	350	40	87	
Segovia	350	40	114	
Seville	400	50	210	145
St. Peter's, Rome	590		160	143
St. John the Divine, N. Y.	400	64	154	142

Externally, the edifice has the traditional forms, with more than usual variety. The western towers are not alike, although of similar height and general form, and there are two towers with octagonal belfries flanking the sanctuary.

It may be added that the instructions gave no clue to the preferences of the committee in the matter of plan and type, and those chosen were surmised to represent the opinions of the greater number of the clergy and churchmen interested.

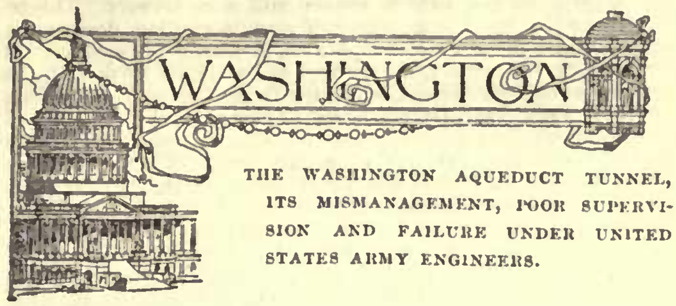
COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

[Issued only with the Imperial Edition.]

THIS design follows in the main the style of the great French cathedrals, the best and most vigorous examples of Pointed architecture. English Gothic might, perhaps, have more naturally suggested itself, but it has not been adopted because it seems to depend largely for breadth of effect upon an atmosphere less brilliant and more soft and hazy than our own.

The whole church is stone-vaulted. The roof is of iron covered with lead or tiles. The support of the upper part of the octagonal tower is upon heavy girders resting upon iron columns concealed in the stonework and is independent of the stone arches and piers. The use of iron securing sound construction with precisely the effect sought by the mediæval architects solves the most difficult problems presented to those masters — the construction of central towers, many of which have fallen, or could never have been completed as designed. A crypt is intended under the whole building, to be kept at a high temperature during winter. The upper stories of the vestry-building are intended for library, etc., and rooms for the clergy. An underground area and boiler-room are shown, but would be better if placed at a greater distance.

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.



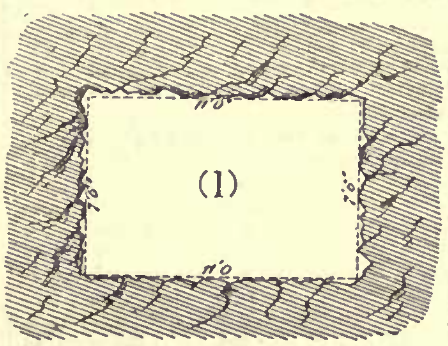
THE WASHINGTON AQUEDUCT TUNNEL, ITS MISMANAGEMENT, POOR SUPERVISION AND FAILURE UNDER UNITED STATES ARMY ENGINEERS.

THE tunnel scheme for increasing the water-supply of Washington was finally approved by the Chief Engineer of the United States Army in July, 1883.

The project was originated by and executed under the supervision of the Corps of Engineers, United Stated Army. They would have received and held firmly all honors accruing from its successful execution and completion. They should bear the odium of carelessness in design, supervision and execution.

From the very beginning blunder on blunder followed each other in rapid succession. First, it was assumed that solid, impermeable rock would be found, through which the tunnel could run straight from the Georgetown reservoir to the new distributing reservoir adjoining the Soldiers' Home, a distance of about 21,000 feet. To test the quality of stone, one shaft was sunk in the whole distance, at the eastern terminus. Not a single boring was made. This seems strange to an architect who would make a number of trial shafts or borings before making any positive assertion as to the foundation of even the limited surface occupied by a building.

Strange to say, Captain Hoxie and Major Lydecker, according to their report, found conclusive evidence in this one shaft that "solid rock on the line of the proposed tunnel would be found at a depth of 116 feet." Stranger still, this single shaft with an examination of some wells in the same neighborhood, but not on the line, was the basis on which the scheme was endorsed by the Chief Engineer United States Army, H. G. Wright. The three working and two connecting shafts were afterwards sunk, varying in depth from 54 to 150 feet below the surface. From the investigation of Major Lydecker, it appears that headings were started nowhere "except in good rock," but the record shows rotten rock in the west shaft.

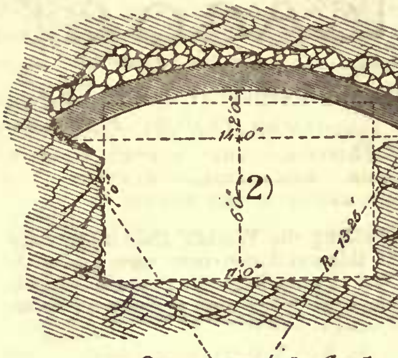


Normal Section. Found impracticable.

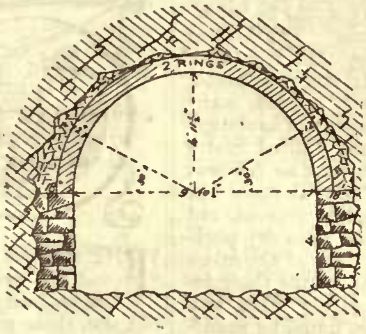
Of course, when the headings had gone a short distance from the shafts, the character of the stone changed in almost every instance, varying from good, hard gneiss to the same "rendered blockey and treacherous by clayey seams." In the eastern portion of the line the rock was found to be mica, hornblende, or talcose schist, containing large quantities of iron pyrites, and still worse, to quote from a report, "some of the rock, which is blue and fairly hard when first mined, turns on exposure to air to perfect mottled clay," others readily disintegrate by action of water. What with fissures in good rock, rock already worthless, and rock which became worthless after exposure to air, a Board of Engineers, appointed by Congress, determined that the tunnel must be lined throughout. The same conclusion might

have been arrived at in the beginning, or the depth and inclination of the good and bad rock could have been determined from the beginning by a sufficient number of borings along the line of the tunnel. Locating towers were erected to overcome natural obstacles while making the survey. These were constructed in such a slight manner that they were blown down when they had been but of little use. They were not rebuilt. Mr. Geo. H. Coryell (who had been familiar with tunnel-work on the Pennsylvania Railroad) was called in as Assistant Engineer, and put in charge of the tunnel. His first duty was a resurvey of the lines on which the drifts were being run from the shafts. These surveys were all more or less out of the true line horizontally or vertically, or in both directions, so the headings would have never truly met; but the greatest error was found between East and Champlain Avenue shafts: where the two drifts should have met, they would have been 21 feet 10 inches apart horizontally, and 16 feet vertically. Mr. Coryell's changes of line were justified by the success in the meeting of his headings, the centre lines of the four headings varying from ¼" to 4" at the point of contact. Think how the tunnel would have been wandering around in the bowels of the earth if the old lines had been continued!

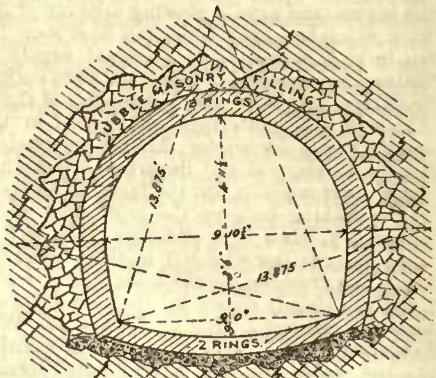
From July, 1887, when the last headings joined to the present time or, more properly speaking, the time of the investigation, the many blunders and incapacity of the corps had shown themselves in the lining and business management. The first idea was to line little, if any, of the tunnel; then it was determined to line portions with 3 rings of brick, 13", and dry stone packing between the arch and the natural stone above. The lining to be horseshoe-shaped, with segmental bottom, two bricks (8½") thick, laid on concrete. Captain Hoxie proposed to line the whole tunnel with concrete. The Board of Engineers, authorized by Congress to decide the question, reported that it should be lined with brick, and packed with rubble masonry or concrete, it not being possible to make a tight job of dry packing. If the advice of the Board had been followed and the work carefully superintended, all would have been well, if the tunnel without metal lining is a feasible scheme. But Lieut. C. McDonald Townsend, who had been about this time put in charge under Major Lydecker, either to keep down expense which had already nearly doubled the estimates or merely for practice and a love of experimentation, determined to build in certain sections of the tunnel, over the top, a segmental arch without side-walls, abutting on the natural rock. It was found, naturally, that blasting would not make a very even side-wall, or a good abutment. Mr. Coryell protested against this form of arch without avail. The experiment and estimates based on the idea were both failures.



Segmental Arch. Found impracticable..

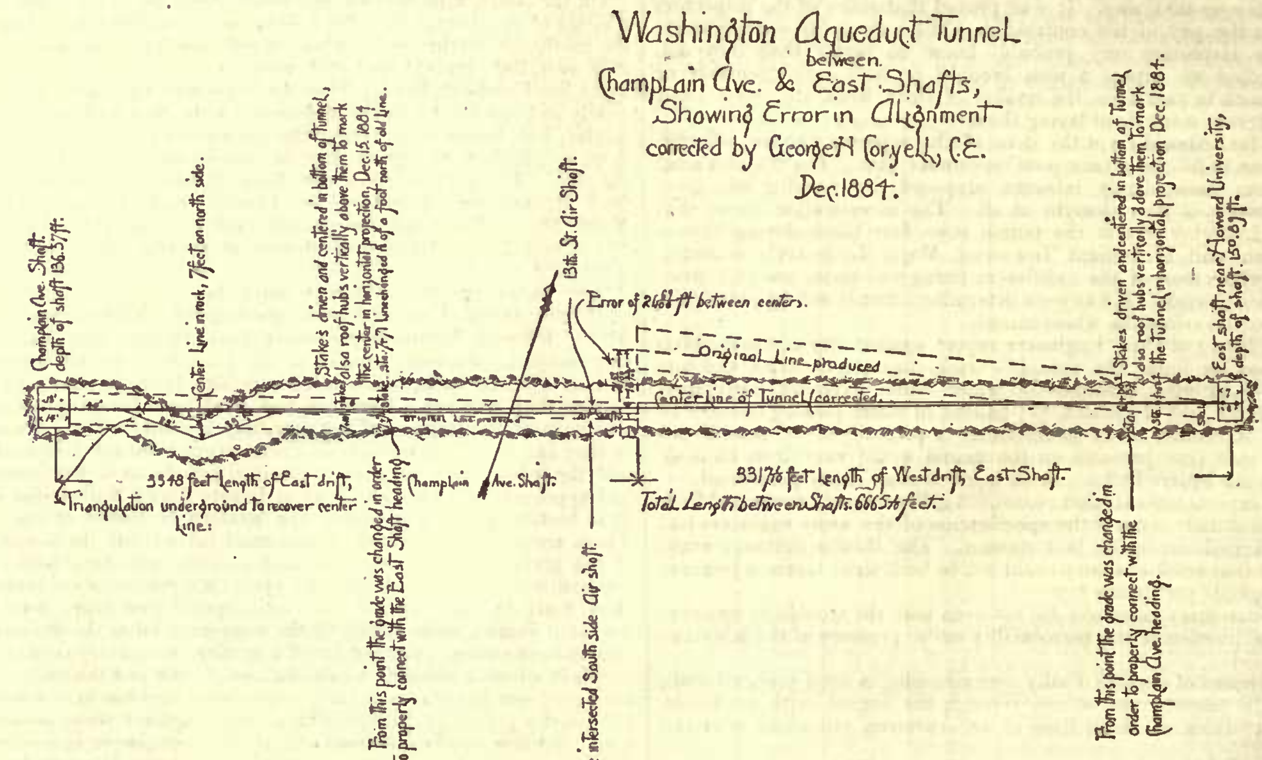


SECTION B
Adopted as a cheap substitute for No. 2 –



SECTION A
the most approved method of Lining adopted.

From a common-sense standpoint, one would think that stone not suitable for a roof, would not be so for a side-wall, even if it had been found possible to blast it with sufficient accuracy for the purpose. After trial this scheme was abandoned, and in the same sections side-walls were built of rubble masonry, and a two ring (8") semicircular arch was built on top of them. It seems strange that this stone, very little of which was suitable in its natural position, should again be used in building side-walls. Who was to decide whether the mason was using good or bad stone, when stone apparently hard and good would disintegrate, some from the action of air, others from the action of water, and others still from the action of gases? I venture to say that capable engineers, capable stonecutters, or even mineralogists, would be unable to decide off-hand in such a matter.



The men who were in the tunnel to decide this important question were inspectors: one of whom had been a blacksmith, another a carriage-builder, still another who said he had never learned a trade,

but had always acted as a kind of foreman. In other portions of the tunnel the engineers proposed to leave the bottom of the natural rock, where seams which were not visible on first blasting developed from time to time, the more of them the longer they were exposed to the air. The Board of Civilian Civil Engineers report in this connection that "improvements far distant, as well as those in the immediate neighborhood, would be in danger of having their cellars flooded, their foundations weakened from fissues in the unprotected tunnel." Now follows the extraordinary lack of supervision, carelessness in selection and supervision of inspectors.

Of course, the whole country has heard of the Washington Aqueduct scandal, the court-martial whitewash and the Congressional investigation.

On September 8, 1888, the *Evening Star* reporter passed through the tunnel, and gave a glowing account of its progress and the good work which had been done, and how soon the city would be rejoicing in that necessity, an abundant supply of water. The United States Army Engineers' accounts were enthusiastic. On September 23, fifteen days later, the first reports of the scandal were published. Although the mutterings commenced at this time, it took many months to sift the matter through the intricate meshes of investigation, Congressional and department committees and United States Army court-martials, but the facts, as finally sifted, were as follows:

The packing between the brick arch and the natural stone was put in dry, when it should have been well packed in cement, and numerous cavities were left in these spaces without even dry packing. The condition in which the tunnel was at the time of the investigation is clearly shown by the examination made for the Congressional Committee: Messrs. Joseph M. Wilson, Henry Flad and Frederick Graff. Some four hundred cavities were found by sounding the walls, five feet apart; here openings were cut into the spaces indicating a vacuum, and the hole measured. Some thirty of these cavities were from 20 to 60 feet long, from 3 to 15 feet wide, and from 0 to 10 feet high. The two largest cavities were:

Length.	Width.	Height.
113.6 ft.	6.0 to 16.0 ft.	3.0 to 10.0 ft.
188.0 "	5.0 " 13.0 "	2.0 " 7.8 "

The general method pursued by the contractors in carrying out the work appears to have been to roughly fill-in the back of the haunches, without any attempt at laying or packing the stone, and to leave the whole of the space above the crown of the arch open. Dry masonry walls were built at intervals and plastered over with cement, so as to deceive any presumably honest inspector who might turn his eyes that way. It was proved that many of the inspectors were in the pay of the contractors while passing upon their work, but the inspectors very probably knew no better than they did. How could we expect a man brought up as a carriage-maker or blacksmith to pass upon the quality of stone, brick and mortar, and the different methods of laying them?

The fault should lie at the door of the superior who had selected such men to fill important positions under him. The masons, most of whom were simply laborers, supposed dry packing was good rubble-work, if they thought at all. The investigation shows that Major Lydecker was in the tunnel some four times during its construction, and Lieutenant Townsend, Major Lydecker's assistant, under whom most of the indifferent lining was done, was in it probably once a week. It has been determined that it will be practically necessary to reline the whole tunnel.

The Board of Civil Engineers report against any of the methods proposed for lining the tunnel — brick, concrete, or brick and concrete — and give examples of water under pressure percolating through the best of cement, 17½ gallons of water passing through 16 inches of cement in 24 hours under a pressure of 77 pounds per square inch (the pressure on the tunnel would vary from 32 to 76 pounds per square inch). Brick is much more easily permeated.

The experts estimate that 26,000,000 gallons would have leaked from the tunnel daily, even if the specification of the army engineers had been carried out in the best manner. The Boston drainage-works proved that brick masonry could not be built tight under a pressure of 64 pounds per square foot.

But our army engineers did not even take the trouble to examine into the question of the permeability under pressure of the materials to be used.

This board of experts finally recommended a steel pipe, rivetted, 6 feet in diameter, to be run through the tunnel, with expansion joints ½″ thick, or three lines of 48″ cast-iron pipes run near the surface.

Major Lydecker was tried by court-martial; his sentence was practically no sentence, three chief-engineers having been committed directly or indirectly to the scheme — Generals Wright, Newton, Duane and Casey having at different times endorsed calls for extra appropriations or reported on the work. The estimates for the tunnel were $599,534.55. The tunnel has already cost over $1,000,000, and it will, according to the Civil Engineers' report, cost nearly $1,000,000 more to complete it according to the later specifications.

After Congressional investigation, it was determined, as a temporary expedient, to run a 48″ main from the distributing reservoir and connect with city mains. This is done under General Casey's advice. He states that it will furnish the city with ample water-supply for ten or fifteen years. A similar promise of relief was made when the stand-pipe was put up at the head of Sixteenth Street, but little or no relief came.

The city of Washington has no voice in the selection, retention or discharge of her engineer corps; criticism, advice and abuse avail nothing. But the people of the District must pay their share of the cost. It is an expensive business, giving the Engineer Corps an opportunity to experiment. Lieutenant Townsend, strange to say, was ignored by the court-martial, and has been retained as one of the assistants to supervise the laying of the 48″ main. The main is now being laid, after several delays, at an expense to Washington of some $260,000.

Washington gets this makeshift of an addition to its water-supply at a cost of some $1,250,000, and cannot even have the satisfaction of discharging its employés.

CHICAGO

THE PARKS OF CHICAGO AND THEIR CHARACTERISTICS. — THE WINTER GARDEN. — THE MENAGERIE. — STATUES AND MONUMENTS IN THE PARKS.

THE present question of holding the World's Fair in our city, and the probable site of this exhibition near some one of the parks, brings, with the recent unveiling of a new statue in one of them, these pleasure-grounds once more most prominently before the public.

Whoever has had aught to do with the energetic Chicagoan has heard, till it has become a more than twice-told tale, the remark: "We have, or will have, the finest park system" in the world.

Chicago once deserved her name of "Garden City," for her residence portion was crowded with houses surrounded with lawns, the lawns with their trees and flowers, often small, indeed, but sometimes occupying a whole square shaded by grand old elm-trees. Houses and trees were swept away by the great fire, and then the city became more one of brick and stone. Before the fire, the parks were finer on paper than in reality, but since that catastrophe the need of them has been greater, and they have increased in size and beauty, again making good Chicago's claim to her name.

On the South Side, Jackson and South Parks begin the chain. By a series of boulevards the West Side can be reached, and there, in the southwest portion, is Douglass; a mile north of this, and about a mile west, lies Garfield, and still north of this and half a mile east, again lies Humboldt Park. Thus the West Side has three parks, not nearly so large as the South Side ones or the North either, for that matter, but better distributing the pleasure-grounds, making them more accessible to the great mass of people, who live in this part of the city. About three miles east from Humboldt, extending north from its northern boundary, lies Lincoln Park, the pride of the North Side. These pleasure-grounds will eventually be connected by a direct line of boulevards, though at present the system is not completed.

The parks on the different sides have each its individual character, which is interesting, as showing the different manner in which different landscape-gardeners have treated practically the same subject. Jackson, situated on the Lake front, is only a pocket-edition of South Park, which is of necessity, from its size, more for driving than walking. Here are fine stretches of waving grass, on which, at certain seasons of the year, hay is made. These lawns, if so they can be called, are bare of trees, except a few on the outskirts, and the whole park suggests a glorified prairie, as if the designer had appropriated what faint hint at beauty Dame Nature had seen fit to bestow upon the southern and western boundary of the city. There are parts of this park where small lakes break the monotony of the green, and near the entrance and the adjoining boulevard compositions of flowers delight the eye of a certain class of citizens. Here Garfield, made entirely of cacti, reposed one year; here the lamented Jumbo, made of exactly the same material as the President, bristles each summer; and not far off a gentleman on a bicycle, a loving couple in a boat, a sun-dial, a calendar, etc., bloom and flourish. The head gardener has his trials like other people, and has very recently published a protest in an agricultural paper against these abominations; but how can he dispense with them when people enjoy them, children cry for them, and the Park Commissioners insist on having them. South Park has but one statue, and that is so commonplace that even that one makes no impression whatever. Jackson has one unique feature in its breakwater, which is in the form of a beach paved with solid granite blocks slanting down under the water.

The West Side parks are more artificial, pretty and pleasant, but no hints from Nature in them are gracefully received. This is, perhaps, wise, the largest proportion of the West Side population being working people or people of small means, for whom a wide prairie is not suitable for a pleasure-ground. There are, consequently, little arbors, shady walks, little bridges, little lakes, all of proportions suitable to the powers of the ordinary pedestrian. These three gardens, Douglass, Garfield and Humboldt, contain: the first two, one hundred and eighty-five acres, and the third, two hundred and twenty-five acres. Being farthest from Lake Michigan,

they are naturally the hottest, and, to offset this, are so shaded by trees as to materially injure the grass.

One of the most interesting features of Garfield Park is the large winter-garden, erected recently at a cost of something like $30,000. It is the largest place of the kind in this part of the country. The structure is entirely of iron and glass, combining all the most approved methods of this kind of construction. It may be referred to more in detail in a future letter.

A very delightful feature of all of these parks is that people are permitted to enjoy them thoroughly. Portable signs with the word "Common" are always to be seen in different parts. Grounds for base-ball and cricket are found in the larger spaces, and tennis-courts are kept in very good condition, and are always well marked off, and plenty of cosy corners are everywhere, where the mothers of small children can ensconce themselves, hang up the baby in a hammock, while the larger children play croquet, etc. Among all the beautiful features — and there are many — this is one of the pleasantest, and means a great deal to a growing city like Chicago, every day becoming more densely populated.

Lincoln Park contains a menagerie. The tropical animals' quarters are in a fine new building. In winter, of course, when all the animals are housed, there is at times a crowd of visitors, and it is a matter of surprise that the doors should be permitted to open in, for with the ordinary in-going and out-coming, a constant stream of people is passing through them. In case of fire, or escape of a lion, tiger or any of the wild beasts, a disastrous panic would most certainly be the result. This building is one of the latest additions to the park architecture, and is a large structure faced with pressed-brick, the design being simple and extremely satisfactory. No columns in the interior interfere with ventilation, view or free circulation of the people, as the roof is carried upon trusses. The floor is of cement, and every attention seems to have been paid to having a building convenient, airy and cleanly, the principal criticism being on the doors, as above mentioned.

The whole length of Lincoln Park, which contains over three hundred acres, stretches along the shore of Lake Michigan, which makes one of its finest features. The drive along the shore two years ago was considered good, with its racing-track, its bridle-path and carriage-way, all shaded by elm-trees, but the lake rose in its wrath one spring night, dashed over the breakwater, and in places washed away the entire roadway.

The present plan is to build a very substantial sea-wall similar to that on the drive south of the Park. This breakwater will be about an eighth of a mile from the present shore. Land will be made next to this which will afford a fine roadway, and the present drive will, consequently, be along the shore of a large inside pond. The work has been begun on this plan, and when finished it will make one of the finest boulevards in any city in the world. It is propo ed, ultimately, to extend the road farther south than at present, making direct communication with Michigan Avenue, which will afford a continuous drive of about twelve miles, a large part of it within sight of the water.

The objects of greatest artistic interest in the Park are the statues, which are the finest works of this kind in the city.

First, on entering, we see the Lincoln Monument, the sight of which is worth a long journey any day. The sculptor is St. Gaudens, and to say it equals the Farragut Monument ought to be praise enough. The statue is of bronze, heroic size. It is approached by a broad, low flight of four granite steps which lead to an elliptical stone platform, sixty by thirty feet in area, and surrounded, except where the steps rise, by a granite bench and balustrade. Cut in the solid balustrade are the words "Abraham Lincoln" in old Roman letters; at the openings of the ellipse wings are carved. On each side of the lower steps are bronze cannon-balls, bearing some of Abraham Lincoln's brave words which thundered around the world. The figure itself stands with its face towards the south, in rugged, simple dignity. The head is bent and the face is looking down. At the back of the figure is a chair of the United States Senate. It is a faithful portrait of a very plain man, but what gives the dignity one can hardly tell. It is idealized and not idealized.

The next monument which attracts attention is a group of Indians, designed and executed by John Boyle, of Philadelphia. It is called "The Alarm," and an appropriate site has been chosen for it on an elevation where the roar of the waves on the breakwater can be heard at all times, offset by the snarling and howling of the animals in their quarters close by.

The group[1] is of black bronze, and consists of a powerful Indian leaning forward, alert and anxious, while a squaw, with her pappoose, crouch at his feet and a gaunt wolf-dog stands by his side, with hair raised and anger in his eyes. The base holds in its four sides bas-reliefs, two having been recently placed there by Mr. Boyle. They are, of course, Indian subjects, but are much inferior to the group, lacking strength and freedom.

Overlooking the northern parterre, sheltered from the rough Lake winds in the midst of sunshine and flowers, stands the German poet, Schiller. The statue is thoroughly inartistic, and has about it no suggestion of the man who could have written Marie Stuart's appeal to the clouds or Thekla's lament. It is said to have been a copy of the statue of Schiller in his birth-place of Marbach, in Würtemberg. If this is true, it is a pity it is so faithfully copied.

At no great distance from this stands the new monument to the discoverer, Robert Chevalier La Salle, the gift of the Hon. Lambert Tree, late Minister to Belgium. The monument has been recently unveiled, and disclosed one more object of truly artistic value to the public gaze. It is a figure in black bronze of heroic size, of a young man clad in the costume of the seventeenth century. He stands with one foot raised on the trunk of a tree, and his earnest, eager gaze is turned towards the southwest, as if trying to catch a glimpse of the mighty rivers, in the discovery of which he lost his life. He is bare-headed, with curling locks falling over his shoulders, and his features are clear-cut, delicate, but strong. A large pistol is in his belt, his sword is at his side, and his legs are encased in heavy leather leggings, the buckles and fastening torn away in places. The artist of this very charming figure is Jacques de Lalaine, and the bronze was cast in Brussels. The pedestal is simply a block of rough Minnesota granite, and it seems as if the whole group would have been more effective had this only been more carefully studied.

At present the only other monumental work is the base of the Grant Monument, a fine granite structure through whose arch-way a charming vista of Lake Michigan can be caught. To this pile the Chicagoan points with pride, and lets it be thoroughly understood that the absence of the statue is not owing to lack of funds. The ducats for the bronze are ready and waiting, and all that is wanting is time by the artist.

By 1892 Mr. Louis T. Rebisso will have finished his work, and it is to be hoped it will be one more object of artistic interest worthy a visit from any stranger who may be, at that time, within our gates.

[1] See the *American Architect* for November 17, 1883.

SOCIETIES

REPORT

THE ARCHITECTURAL LEAGUE OF NEW YORK.

THE fifth annual exhibition of the Architectural League of New York will open at the Fifth Avenue Art Galleries, No. 366 Fifth Avenue, New York, on Friday, December 20, 1889, and will continue for three weeks, closing January 11, 1890.

The galleries will be open for the reception, by card, December 18. Press, 10 A. M. to 4 P. M., and reception in the evening.

The exhibition will consist of drawings, etc., not before publicly exhibited in New York, representing so far as possible the present condition of architecture and the allied arts. All kinds of works are admissible, such as: Architectural designs, perspective drawings, sketches in pencil, pen-and-ink, water-colors, charcoal, etc., elevations, working-drawings and photographs of executed work, paintings in oil or water-color of architectural subjects, sketches for interior decoration and furniture, designs and cartoons for stained-glass, mural decoration, executed work such as mosaics, stained-glass and decorative stuffs, wrought-iron and metal-work, sculpture, carving and casts, and models of architectural and decorative work.

Works will be received only at the Fifth Avenue Galleries on the 10th and 11th December, 1889. No works will be received before or after that date.

The League will collect and return all works in the city, at the expense of exhibitors, if the Secretary is notified when the blank is returned.

The blank form attached to this must be filled and sent to the Secretary by the 5th of December.

A card must be attached to the back of each drawing or exhibit, giving the title, name of exhibitor, the address, and where to be returned.

All works intended for exhibition will be at the risk of the owners.

All rules customary at exhibitions and not above mentioned will be considered to apply equally to this exhibition.

All drawings and photographs must be framed or mounted.

Exhibits will be catalogued by title with name of exhibitor, and it is especially desired that the name of the draughtsman may appear; any other data may be on margin.

CHAS. I. BERG, *Secretary.*

47 West Forty-second Street.

The conditions for third annual competition for the gold and silver medals of the Architectural League in connection with this exhibition are as follows:

1. The competitors must be residents of the United States, and under the age of twenty-five; and

2. The drawings shall be made in conformity with the following programme, and, in all parts and portions, entirely by the hand of the competitor.

The drawings will be judged by the jury appointed for that purpose.

The successful drawings, and such others as may be thought worthy, will be hung at the exhibition, the first and second prize-drawings being so indicated, and these latter shall thereupon become the property of the League.

PROGRAMME.

The drawings shall exhibit an entrance to a World's Fair; the central feature of which is to be constructed of stone and to remain as a permanent Memorial.

The Structure is to be located on a plot not exceeding 50′ 0″ x 200′ 0″, and to consist of at least one grand entrance for ceremonial processions, two

driveways, and such other entrances for foot-passengers as may seem advisable.

Each contributor is required to exhibit two sheets of drawings, one to contain a ground-plan, front elevation and section, with such other drawings as may be necessary to explain the design and construction, all drawn to a scale of 1-8 of an inch to the foot, and one to exhibit a perspective view of the whole, drawn to a scale of 1-4 of an inch to the foot.

The plan and elevation sheet to be finished in line with India ink and lining-pen; no brush-work on this sheet, except in blocking-in openings and sections. No shadows are to be cast.

The perspective sheet to be rendered at will.

Each sheet to be cut to the uniform size of 24″ x 32″ and to be white card or Bristol board, or Whatman paper mounted on stretcher. No colored borders, frames or glazing will be allowed.

Each sheet must be distinguished by a motto or cipher. A sealed envelope bearing the same motto or cipher must contain the name, full address, place and date of birth of the author, and must be mailed to the Medal Committee, No. 47 West Forty-second Street, New York, on or before December 10, 1889. Drawings are to be delivered flat, carriage paid, at the same time and place. They will be returned at the close of the exhibition at the expense of the contributor.

Edward H. Clark,
Ehrick K. Rossiter, } Medal Committee.
Edward T. Hapgood,

THE BOSTON ARCHITECTURAL CLUB.

The Boston Architectural Club held its first monthly exhibition of this season September 23–30.

The drawings exhibited were the work of the members and comprised the various sketches in pen, pencil, and color, photographs and rubbings made by them during their vacations.

The principal sketches exhibited were those of C. F. Maher, T. F. Walsh, Dwight, Blaney, A. E. Eastman and W. T. Partridge. Photographs, C. P. Overmier; Rubbings, W. T. Partridge. These latter were the first of the kind exhibited and among them were shown every variety of the grotesque death's heads and quaint inscriptions found on the tombstones of the early settlers of Dorchester, Dedham, Portsmouth and Northampton.

The members intending to compete for the Rotch Scholarship have organized a class and laid out a definite line of study for the coming examination in the spring.

A reception to and an exhibition of the work of E. A. Josselyn the last returned holder of the Scholarship will be given this month.

THE WASHINGTON CHAPTER, A. I. A.

The Washington Chapter, American Institute of Architects, has elected the following officers for the ensuing year: W. M. Poindexter, *President;* J. R. Marshall, *Vice-President;* Glenn Brown, *Treasurer;* and R. Stead, *Secretary.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE EXHIBITION OF DRAWINGS AT CINCINNATI.

Cincinnati, O., October 11, 1889.

To the Editors of the American Architect:—

Dear Sirs, — Feeling certain of your hearty coöperation and sympathy, we take the liberty of asking another favor at your hands:

We would ask you to kindly urge upon the sketch-clubs the great importance of sending on their exhibits at the earliest date possible, and especially mention that any prize-designs intended for reproduction in our illustrated catalogue must positively reach us not later than October 19, 1889. Our printer will require all the remaining time to reproduce designs and print catalogues, and if the clubs do not comply with our request, we shall be unable to complete our catalogue for the reception night.

We are receiving many letters from clubs and individuals, all of which are favorable.

The clubs from following cities have been heard from, to date: Chicago, Boston, New York (both "League" and "Sketch-club"), St. Louis, Minneapolis, St. Paul, Detroit, Philadelphia, Columbus and others whose answers are at the present moment not directly at hand.

Among the club-exhibits will be found drawings by many well-known draughtsmen, some of whom we name below: Messrs. D. A. Gregg, R. C. Sturgis, C. Howard Walker, C. H. Blackall, F. H. Bacon, Harvey Ellis, A. B. Chamberlain, Paul Lauthrop, W. B. Mundie, T. O. Fraenkel, Oscar Enders, W. J. Williamson, C. B. Schaeffer, J. P. Annan, Louis Seubert and others.

Mr. H. P. Kirby will send us a large display, as will also Messrs. Shepley, Rutan & Coolidge.

Mr. Bruce Price has signified his willingness to contribute, and Messrs. Carrère & Hastings will favor us with a display comprising among other things the original drawings of their Florida hotels, and also the original competition drawings for the Cathedral of St. John the Divine, beside these we expect to have a large number of drawings from our local architects.

Through the generosity of some of our local firms we are enabled to offer another prize (a gold medal), making in all five prizes. This prize will be awarded for the best freehand drawing of original architectural detail, and will be open to all draughtsmen under *twenty-one* years of age who are in the employ of an architect of good standing.

It is not essential that competitors for this prize shall be members of any sketch-club. All designs for this prize must reach Cincinnati not later than November 16, 1889.

All paper to be 15″ x 20″, rendering, subject, scale, etc., optional.

It would be well to mention that we will insure all exhibits sent us as soon as received. Very respectfully,

John Zettel, *Secretary* C. A. C.

NOTES & CLIPPINGS

Composition of Old Mortar. — An interesting and instructive fact has just come to light. Four samples of mortar taken from the remains of a foundation of great antiquity which were laid bare in Germany in March of this year were chemically analyzed. The striking feature in the analysis is the percentage of lime to the sand used, the proportion being in the four samples 8.86, 12.65, 5.33 and 13.87 per cent of sand respectively to one part of lime; the sand used being very coarse-grained. The remains were supposed to be those of a temple of the Persian God of light, Mithra, of about the middle of the third century. — *Pittsburgh* (*Pa.*) *Dispatch.*

A Specimen Steel Building. — The new building for Rand, McNally & Co., on Adams Street, Chicago, will contain 15 miles of steel railway 65-pound rails in the foundation, besides the 12-inch and 20-inch steel beams. In the building there will be 12 miles of 15-inch steel beams and channels, 2¼ miles of ties and angles in the roof, 7 miles of tie-rods, 10 miles of Z steel in the columns, 12 miles of steam pipe, 350,000 rivets and bolts, 7 acres of floors, the boards of which would reach 250 miles, were they laid end to end. If all the fireproofing and concrete used in the building were made into a pyramid 40 feet square at the base and tapering to the apex the pyramid would stand as high as the Eiffel tower — 1,000 feet. — *Iron World.*

An Asbestos Joint. — A permanent and durable joint can, it is said, be made between rough cast-iron surfaces by the use of mineral asbestos mixed with sufficient white lead to make a very stiff putty. This will resist any amount of heat, and is unaffected by steam or water. It has been employed for mending or closing cracks in cast-iron retorts used in the distillation of oil and gas from cannel coal. The heat being applied to the bottom of retorts, and the temperature of the iron maintained at a bright red heat, after a time the bottom of the retort would give way, the larger portion of the crack being downward toward the fire. The method employed was to prepare the mixture, and place it on the top of a brick, then put the brick on a bar of iron or shovel, and press the cement upward to fill the crack in the iron, holding it for some time until it had penetrated the cavity and somewhat set. Of course, during this operation, the lid was removed from the retort, so that no pressure of gas or oil forced the the cement outward until set. — *Iron World.*

The Sliding Railway. — Whether the sliding railway with which experiments are now being made at the Paris Exhibition be destined or not to be the railway of the future, the inventor of it claims for his invention a superiority over the present system; for with the new, and what may be called hydraulic railway, there will be no more wheels, nor steam, nor noise, nor grease, while the speed, on an average, will be over a hundred miles an hour. Water at high pressure is the sole agent employed for driving a traction, and for wheels are substituted oblong iron slides, the same width as the rails — that is to say, about nine inches wide. French and English engineers, we read, are looking on with interest at the experiments being made, and as yet it seems they have not discovered any real objection to the system. The inventor of it readily admits that the first cost of laying a railway upon his principle would be nearly double that incurred as railways are now laid; but, on the other hand he claims that the economy in the working expenses would be ninety per cent and that with the new system trains could no longer run off the rails, and there would be an absolute stopping power superior to that of any brakes now employed. He is evidently an earnest believer in his system, upon the real merits of which competent judges will in time pronounce. — *London Standard.*

The Cathedral of Worms. — The London *Builder* says: "The Cathedral of Worms is to be restored. The question has been locally discussed for the last three years, and, although experts who were consulted agreed that there was serious mischief going on which was endangering the structure, they differed as to the cause. Thereupon the Dean, Mr. Fehr, took the matter in hand by causing a number of faulty places to be uncovered, and then published the result and his opinion in a pamphlet. His arguments appearing unanswerable, the Building Committee have determined to go to work at once, and have called in Professor Freiherr Von Schmidt of Munich, the architect of the recently restored Church of St Catherine, in the neighboring little town of Oppenheim, also on the Rhine. Professor Von Schmidt has been requested to submit by May 15, next, a complete set of plans of the Cathedral in its present state, along with another set showing his suggestions for the completion of the structure, together with the estimates of cost. Most of our readers need not be reminded that the building is one of the most interesting cathedrals on the Rhine. It is mostly in the

Romanesque style of the twelfth century, the dimensions being 423 feet by 87 feet, by a height of 105 feet in the nave; it has four towers, two domes, and a double choir, and abounds with rich carving. It is to be hoped that any work done on the existing portions will be confined to necessary repairs, or Worms will cease to be 'a Romanesque cathedral.'"

Patent Infringement. — In the suit, in the Eastern District, of the Bridgeport Wood Finishing Company *vs.* New York Wood Finishing Company and others for infringement of the Wheeler Patent, covering the use of ground silex, quartz, feldspar, etc., in a wood-filler, subpœnas have been served on all the defendants, citing them to answer on the first Monday of November, 1889. Application for an injunction, during the pendency of the suit, will be made to the Court.

Copying Drawings. — A new method of copying drawings, which may be found of service, is given in the *Deutsches Baumgewerbes Blatt.* Any kind of opaque drawing-paper in ordinary use may be employed for this purpose, stretched in the usual way over the drawing to be copied or traced; then the paper is soaked with benzine by the aid of a cotton pad. The pad causes the benzine to enter the pores of the paper, rendering the latter more transparent than the finest tracing-paper. The most delicate lines and tints show through the paper so treated, and may be copied with the greatest ease, for pencil, Indian ink or water-colors take equally well on the benzined surface. The paper is neither creased nor torn, remaining whole and supple. Indeed, pencil-marks and water-color tinting last better upon paper treated in this way than on any other kind of tracing-paper, the former being rather difficult to remove by rubber. When large drawings are to be dealt with, the benzine treatment is only applied to parts at a time, thus keeping pace with the rapidity of advancement with the work. When the copy is completed the benzine rapidly evaporates, and the paper resumes its original and opaque appearance without betraying the faintest trace of the benzine. If it is desired to fix lead-pencil marks on ordinary drawing or tracing paper, this may be done by wetting it with milk and drying in the air. — *Iron.*

The Cost of Wasted Power. — A writer to the *Scientific American*, commenting on the popular statistical assertion that only three out of every hundred men are successful in business, says that lately an investigation was made by a number of firms to see what became of the working human power for which they were called on to pay, and a portion of which they believed ran to waste, thus unnecessarily increasing their expense account. It was found, in one instance, that sixty-five per cent was wasted, and in every case it was shown that there was a large quantity of unexpended power for which no productive return was made to the firm interested and paying therefor. Whether the same ratio of successful to unsuccessful men is maintained with regard to the assurance business, we are not prepared to say. In making this remark, the term successful is used as applicable to those who work constantly and with proper energy during prescribed business hours. It is obvious that many assurance agents, pushing, active and diligent though they are in the main, do not accomplish all they have the capacity for, because they have this "waste of power" to contend against. Men whose remuneration is contingent upon results rarely see the advantage of setting aside certain hours of the day as work-time, during which they should canvass as persistently as they would do any other duty devolving upon them. It is well enough to extol the virtues of life assurance in season and out of season with more or less success in getting business; but we venture to assert that no agent, assuming he has ordinary ability, will fail to make his mark if he keeps steadily at work day in and day out, putting in regular time at canvassing. It may be irksome at first to thus bind one's self down to a routine of hours, but a fair test will convince the most skeptical that it has great advantages, prominent among which is consciousness that success has not been hindered by "waste of power" in letting the time go without utilizing every opportunity to press forward in the race for advancement in life. — *Spectator* (*N. Y.*).

Cost of Electric Lighting. — The following condensed statement shows the prices paid for all-night lighting by 2,000 c. p. lights in the following-named cities:

	No. lights	Price per light
Albany, N. Y.	481	$182.50
Rochester, N. Y.	252	104.50
Kansas City, Mo	60	200.00
Salem, Mass	160	164.25
Hoboken, N. J	10	146.00
Manchester, N. H	235	156.95
Fargo, Dak	25	240.00
Newark, N. J	81	146.00
Dayton, O	122	150.00
Akron, O	171	157.48
Kalamazoo, Mich	128	182.50
Springfield, Ill	100	137.50
Boston, Mass	700	237.50
Des Moines, Ia	88	141.00
Texarkana, Ark	18	160.00
Grand Rapids, Mich	110	140.00
Washington, D. C	350	182.50
Camden, N. J	85	146.00
Plymouth, Pa	12	146.00
Duluth, Minn	180	127.00
Scranton, Pa	322	73.00
Binghampton, N. Y	107	140.90
Syracuse, N. Y	300	144.00
Fall River, Mass	50	180 00
Philadelphia, Pa	33	200.75
Aspen, Col	16	216.00
Montgomery, Ala	100	155.18
East Saginaw, Mich	126	140.00
Average		$160.54

The statement shows a tolerably wide range from $73 to $240, and indicates that electric lighting can be done much cheaper than it is done in most cities. — *Engineering News.*

TRADE SURVEYS.

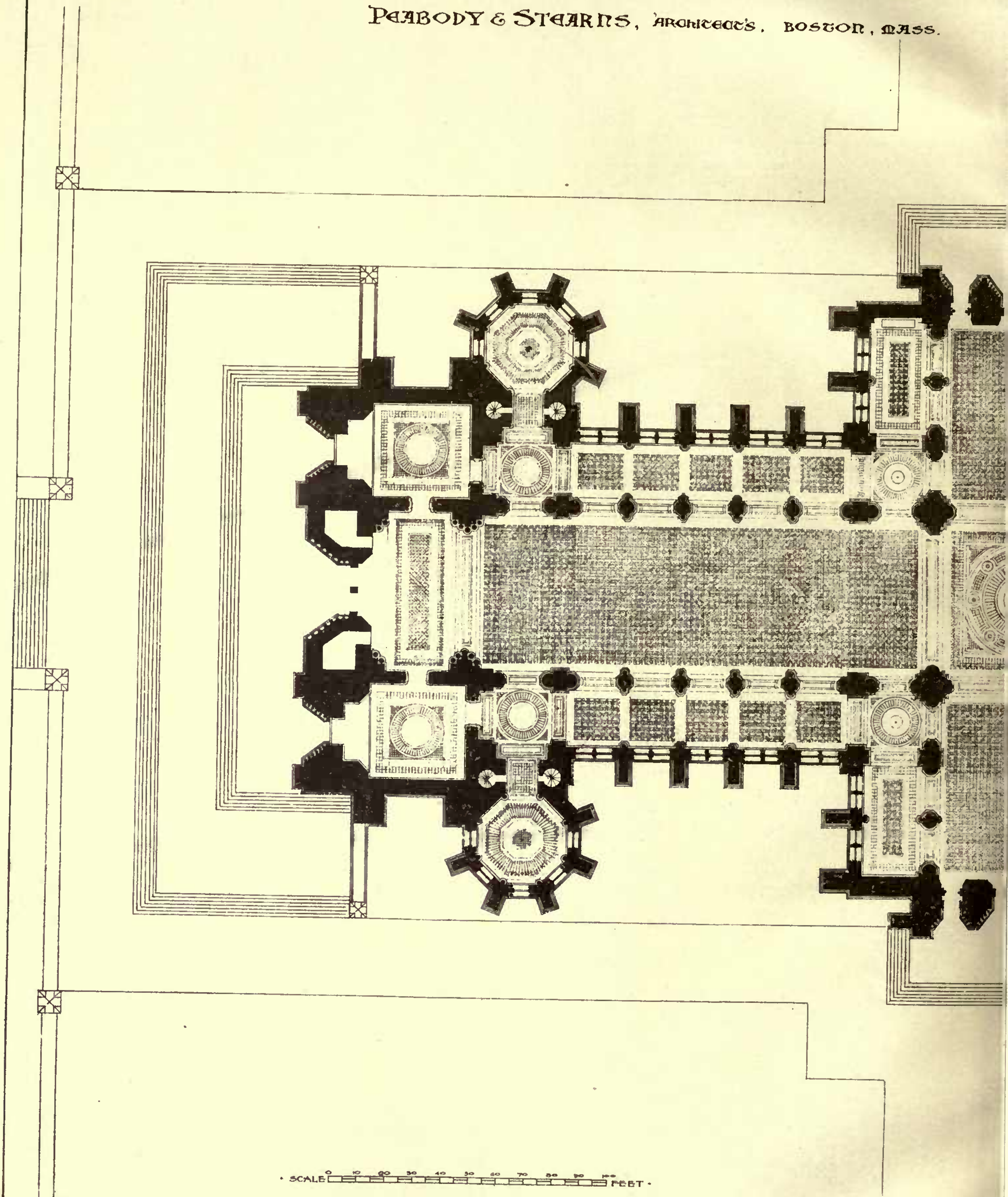
The distinguishing feature in business circles at this time is the pushing in of orders a little beyond the producing-capacity of existing mechanical appliances. The effect of this is to harden prices somewhat more than healthy competition would bring about. Theorists argue that, therefore, a reaction is inevitable, and that wise men who have much money to invest or plans to execute, will wait until it comes. But the theory, like many others, cannot be so readily squared up to every-day rules. Manufacturers know better than any class of men how disastrous an advancing tendency often becomes, and they are wisely and quietly using all the power and influence of their respective associations to keep enterprise and demand unchecked, and wisdom to the front. Financial symptoms are not favorable. The possibilities of stringency are becoming apparent to persons and classes who seldom give a thought to such underinfluences. The urgent demand for currency in the interior continues at the rate of one million dollars a day and over. Commercial railroad and industrial conditions are all healthful. Railroad gross earnings from one hundred and forty-four roads exhibit for September an increase of over four million dollars above the earnings of September last year, on an additional mileage of about 3,000 miles. Despite the dreary misgivings and one-sided prophesies of railroad managers the railroad situation is improving, and indications of it are more clearly observable in London journals than at home. Congress will not dare do what the radical ones among railroad men would have done. The thing is now being done in railroad circles which the law contemplated, viz., more honesty and capability in management, and the recognition of a higher ethical standard for guidance. The discipline has been applied, but the stubborn and self-willed managers have sought every loop-hole of escape from the discipline, but it has come on all. The railroad requirements promise to be of such dimensions as to give a specific impulse to demand. Since October 1, over three hundred thousand tons of steel-rails and steel-billets have been contracted for, and over one hundred thousand tons of Bessemer pig-iron. It would be impossible to give more than a bird's-eye view of the industrial and manufacturing condition. Forty years ago the State Government of Pennsylvania, which authorized the purchase in foreign markets of four six-ton locomotive engines, refused for a long time to accept four eight-ton engines which the delegated agent had concluded to purchase instead. This month the Baldwin Locomotive Works at Philadelphia will complete and deliver 100 locomotive engines, nearly all of them 60 tons in weight each. Their output this year will be 750; all of the locomotive-builders are reported busy. Ninety-pound rails are becoming common on roads subjected to heavy traffic. The rush of orders for machinery is filling many establishments with winter work much before the time. Pumps and pumping machinery is in very urgent request. Heavy engines are being ordered, and electrical machinery of unusual power and capacity is in demand far in excess of the usual autumn limits. The factories of Boston, Providence, Springfield and New Haven, in New England, and the score or two of large machinery establishments in the Middle States began two or three weeks ago to load up with work for delivery during the first three or four months of next year. Managers of industrial establishments furnish most positive assurances of genuine business activity. Small shop equipments form an unusually interesting and important feature of existing demand. Many writers pretend to see possible disaster lurking in existing activity, but unprejudiced observation fails to see cause for alarm.

Wealth is being created faster than ever, and its accumulations make possible the execution of schemes and projects which, a few years ago, would have been regarded as almost chimerical. The labor leaders of the Knights of Labor and the Federation of Labor met this week in Philadelphia to consult over the contemplated eight-hour strike. The Knights fear to endorse the scheme, and their leaders' utterances are not in harmony with violent or aggressive methods next spring. Public opinion is decidedly against any sweeping effort to arbitrarily force down the hours of labor, but it would welcome the solution of such a problem at the proper time through the quiet mediumship of arbitration. Labor is inclined to follow the well-considered action of its chosen leaders in most matters, but in this there will be much consultation in subordinate organizations. If, as recently stated at a labor gathering in Chicago, there are two million idle men in the land, it would seem the time is not opportune for such an effort; but whatever idleness there is is chiefly confined to unskilled, rather than skilled labor. Capital will, however, be better able to tie its purse-strings next spring than last. By that time, the increased industrial activity now everywhere apparent will have produced such a surplus that the markets will not be affected by a stoppage. There are several exceptions to this statement, however, and one is the iron trade, another the shoe-making industry. The builders will not relish a stoppage, but even they will be able to endure it better than last spring. The scheme of a general eight-hour strike is dear to the heart of the average laborer. Their leaders and lecturers have been talking and writing of it for years, and hence there is a strong motive power behind it. The strongest reason why no strike will occur is, or will be, that employment and good wages will be general next spring. It requires a certain percentage of disemployment and of discontent to leaven the lump. This sort of yeast will be lacking, and there is danger, therefore, of spoiling the baking — a fact which labor leaders already see. Wages, on the whole, are advancing. If railroad building should strike a ten-thousand-mile limit next spring, common labor would be hard to move. It is impossible to weigh all the factors that may enter into the case, but, as things are drifting, the eight-hour agitation has some serious obstacles to overcome. Besides, there is a latent jealousy between the two organizations that would manage it. Employers of large bodies of laborers do not attach much importance to the preparations, considering them the result of the efforts of leaders, who have to be pecking at the subject. There is a great outflow of labor to new manufacturing towns also, and a general strike in the larger Eastern cities and towns would work in one sense to the advantage of these smaller places. The country at large will enter upon next year's operations with a stronger foundation as regards prices, supplies, wages, and a knowledge of probable future requirements than it has ever had. The efforts of employers and manufacturers are to repress undue productive activity and to control competition. The better conditions abroad are restricting certain classes of labor, and employers in several foreign countries manifest much concern at the very general upward movement of wages. It may be, perhaps, years before the improvement will be sufficient to hold very many laborers in their old homes who would otherwise seek homes here; but the causes have begun to work, and from this on an equalizing tendency is at work which will help to improve the condition of the laborer abroad, as well as to add to the comfort and possessions of the laborer on this side.

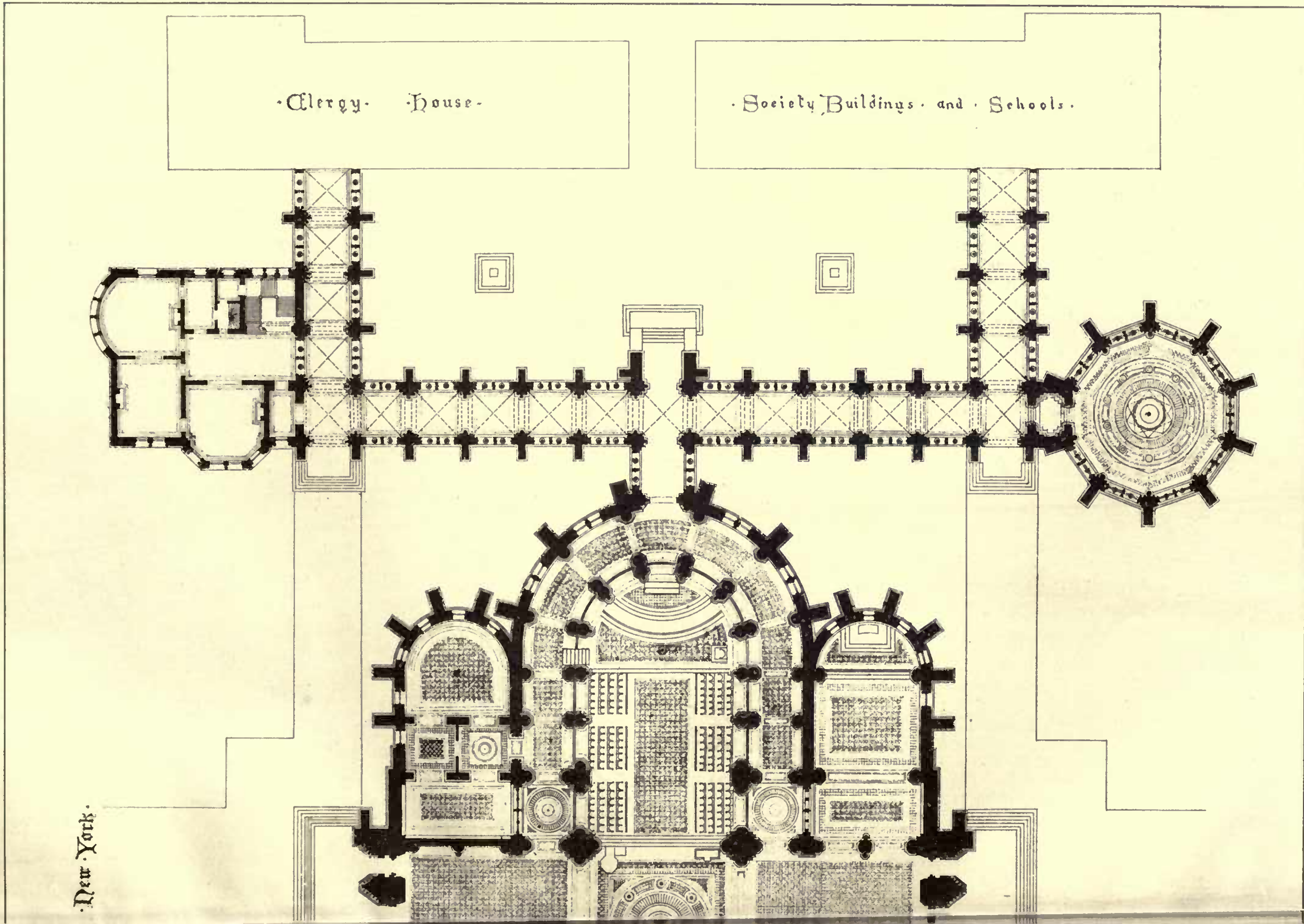
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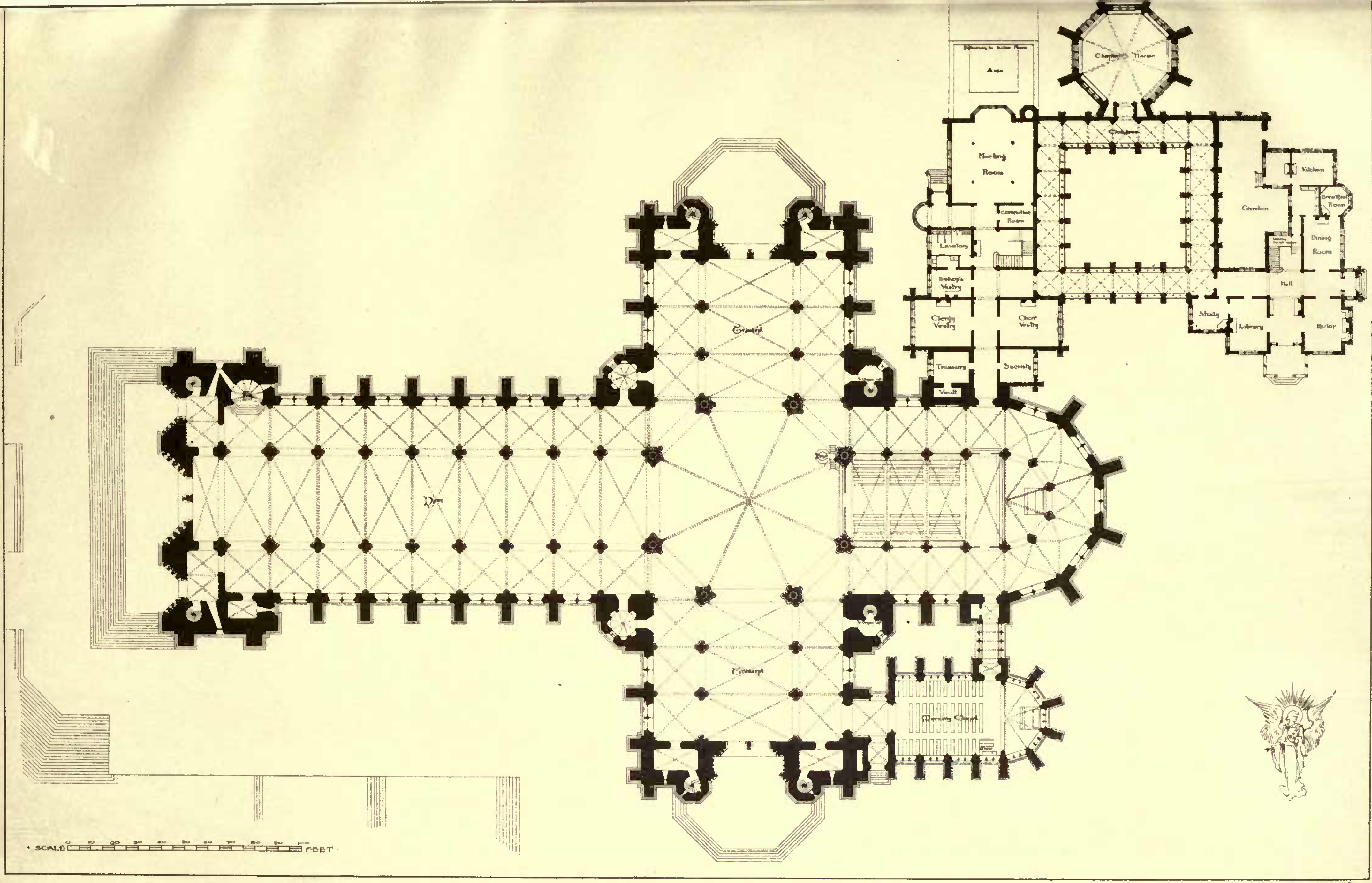
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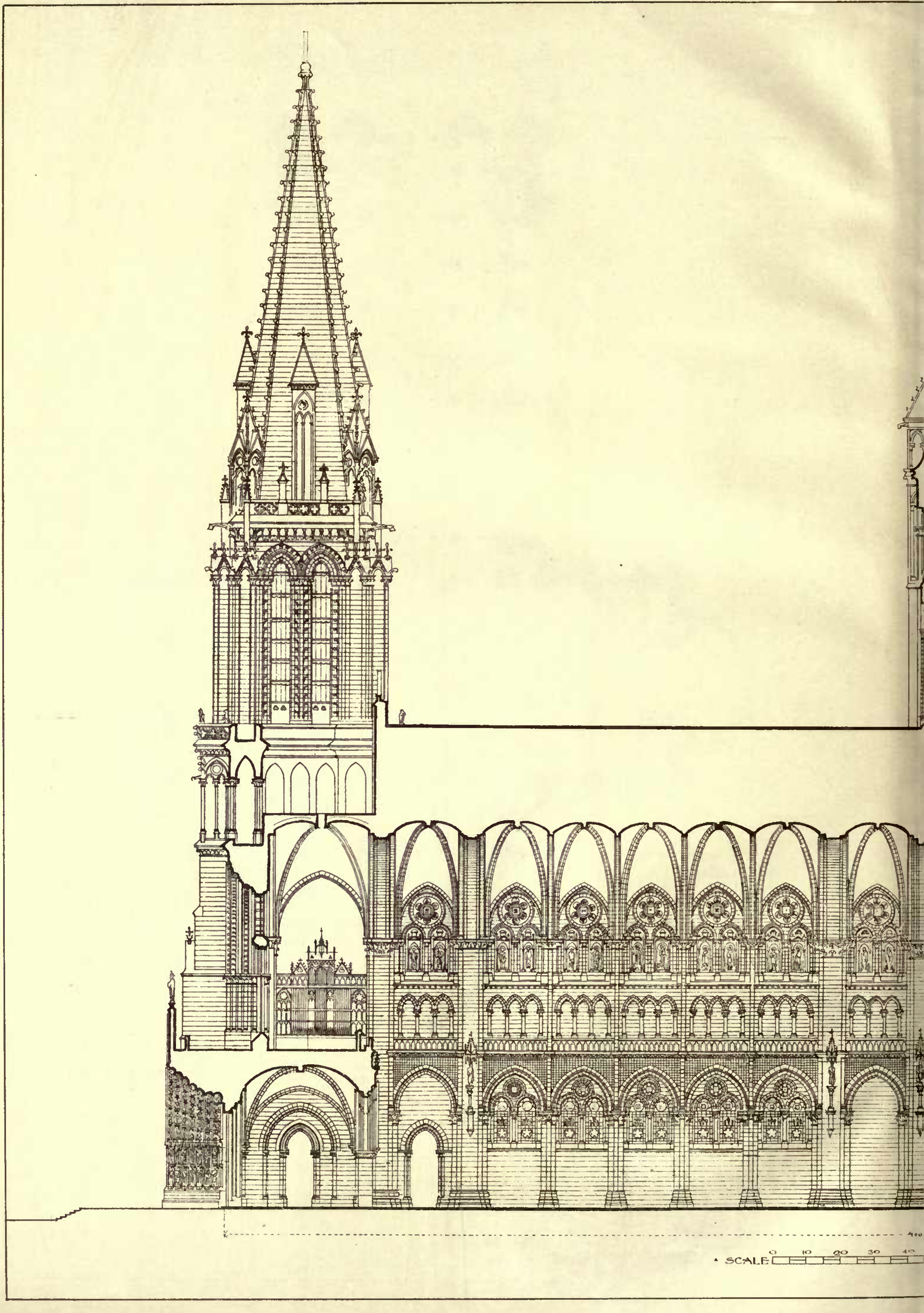
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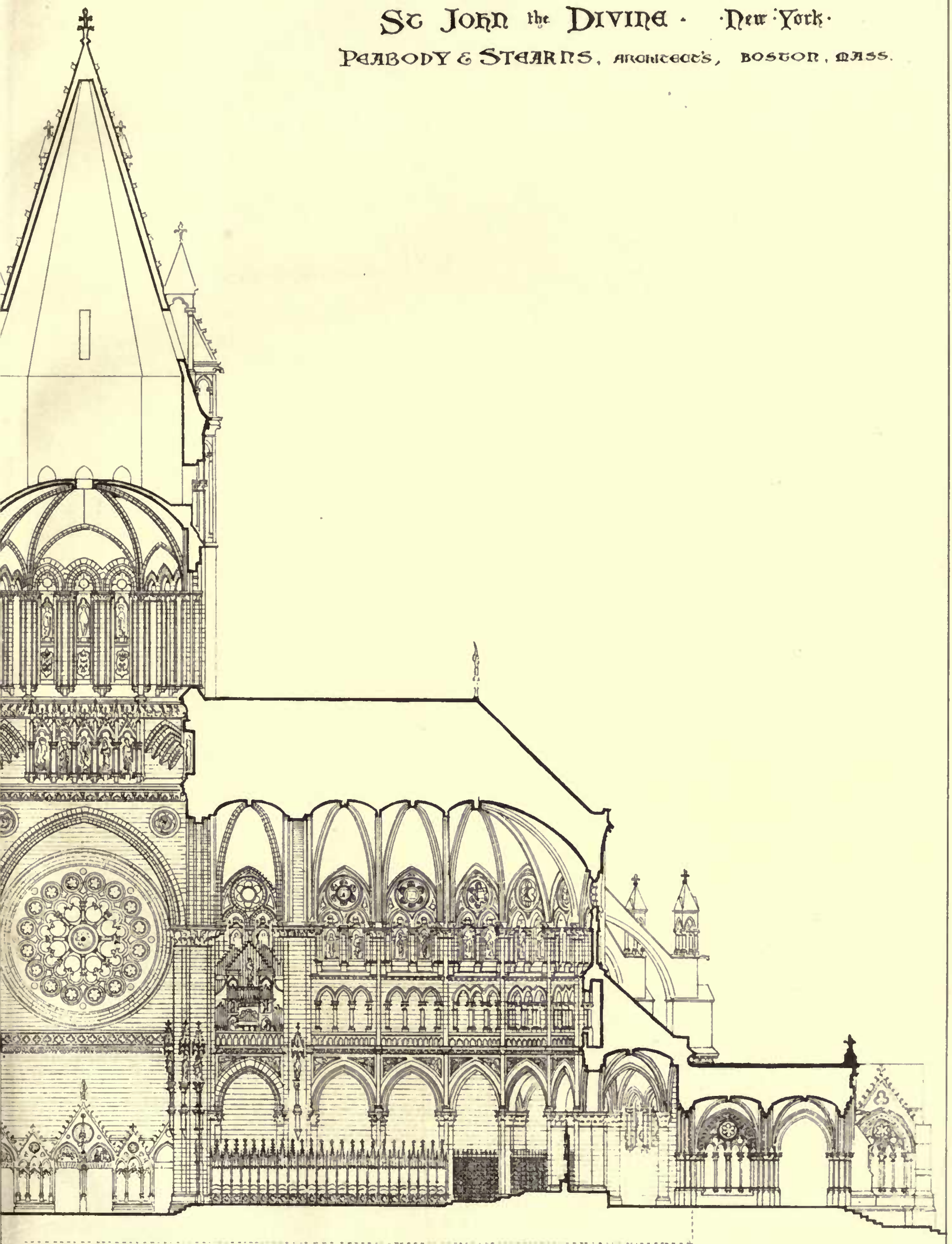
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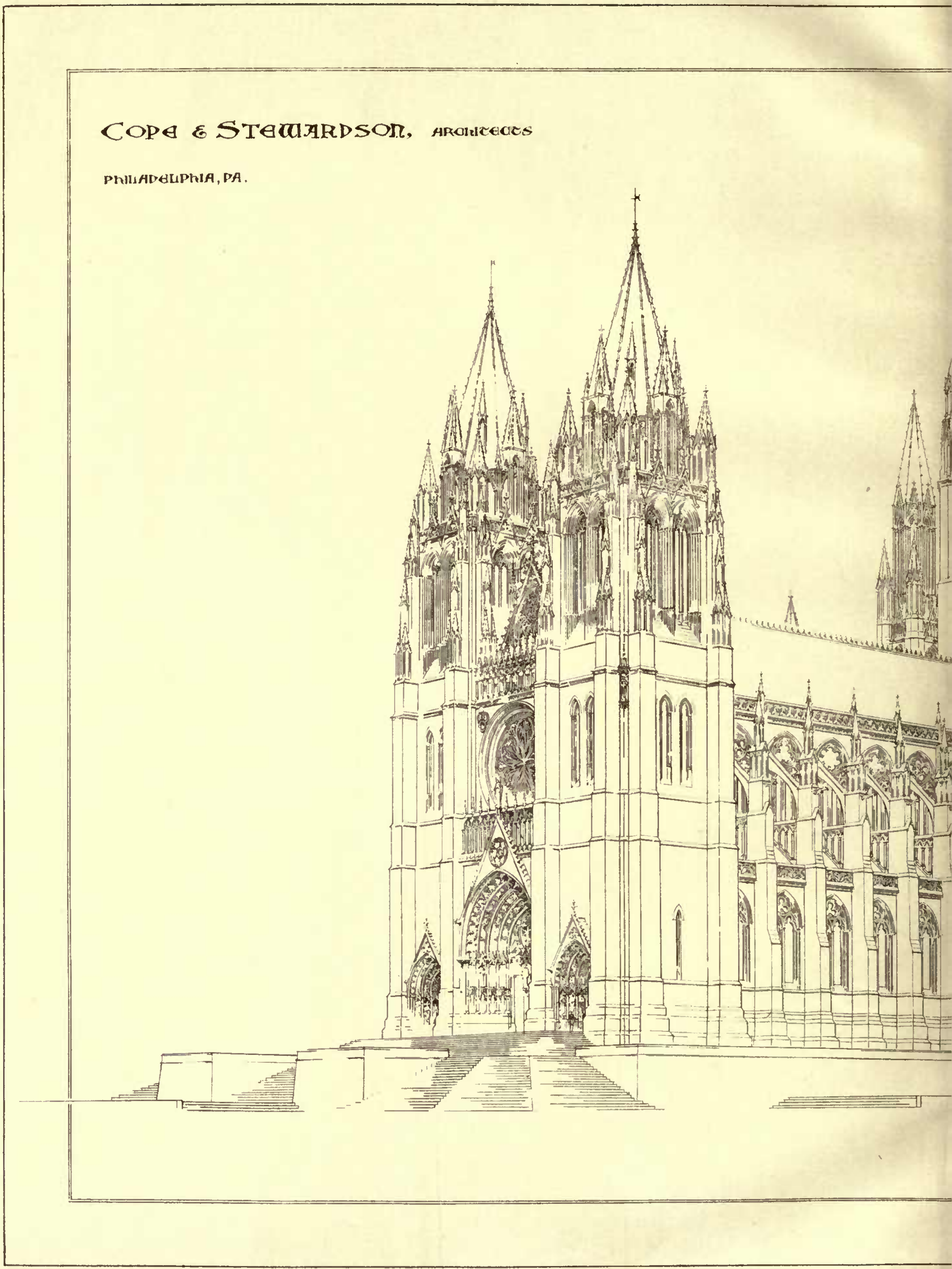


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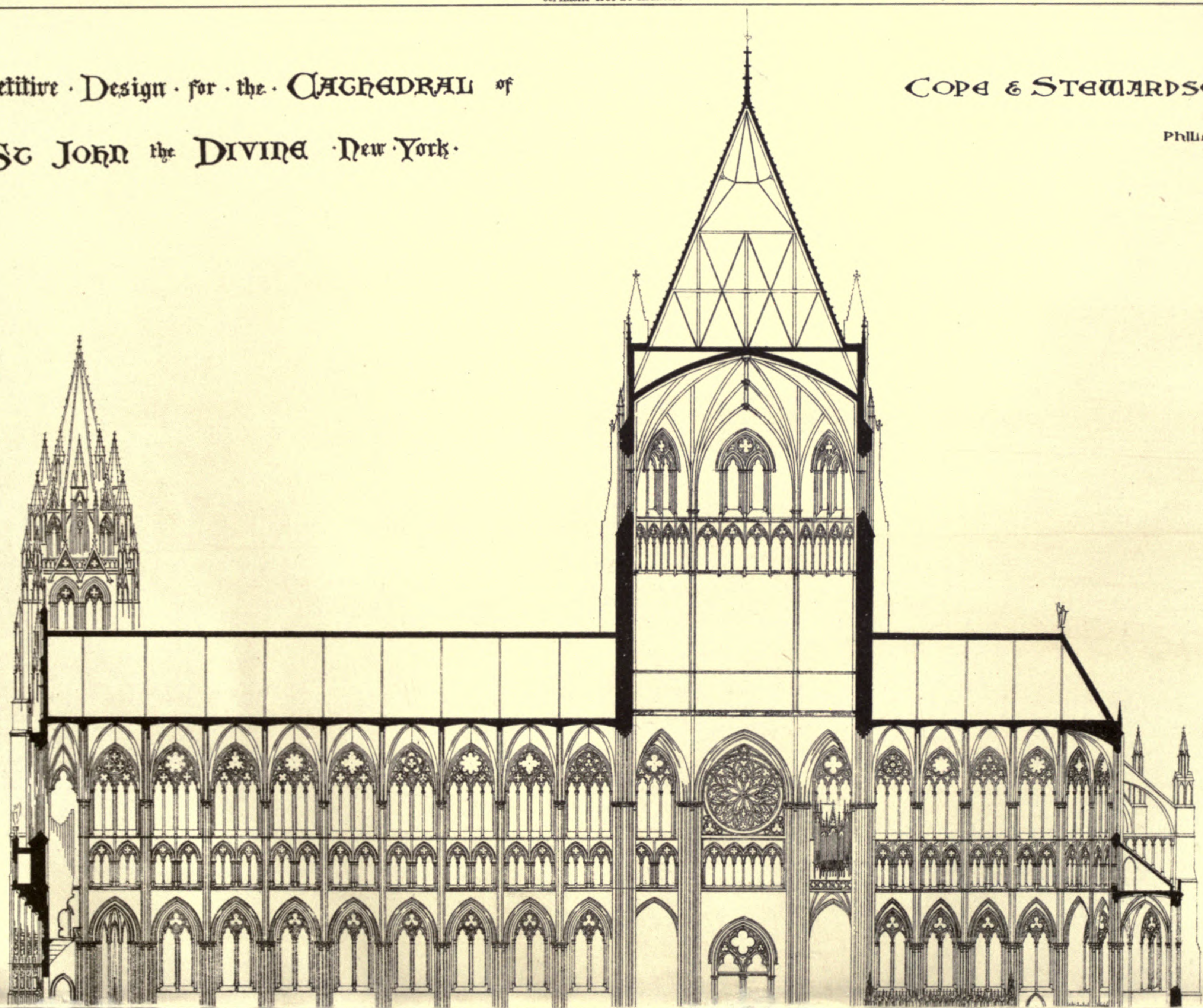


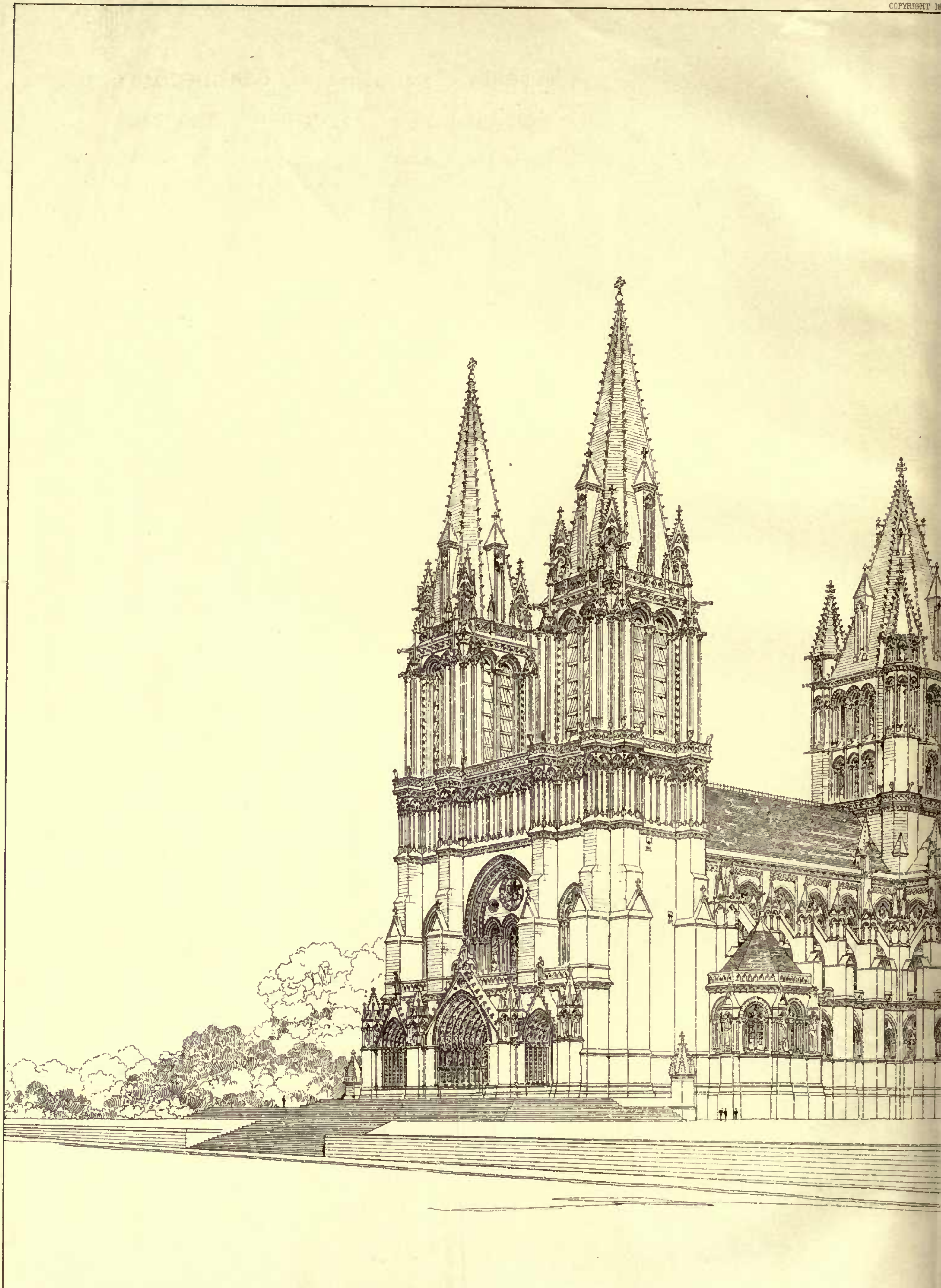


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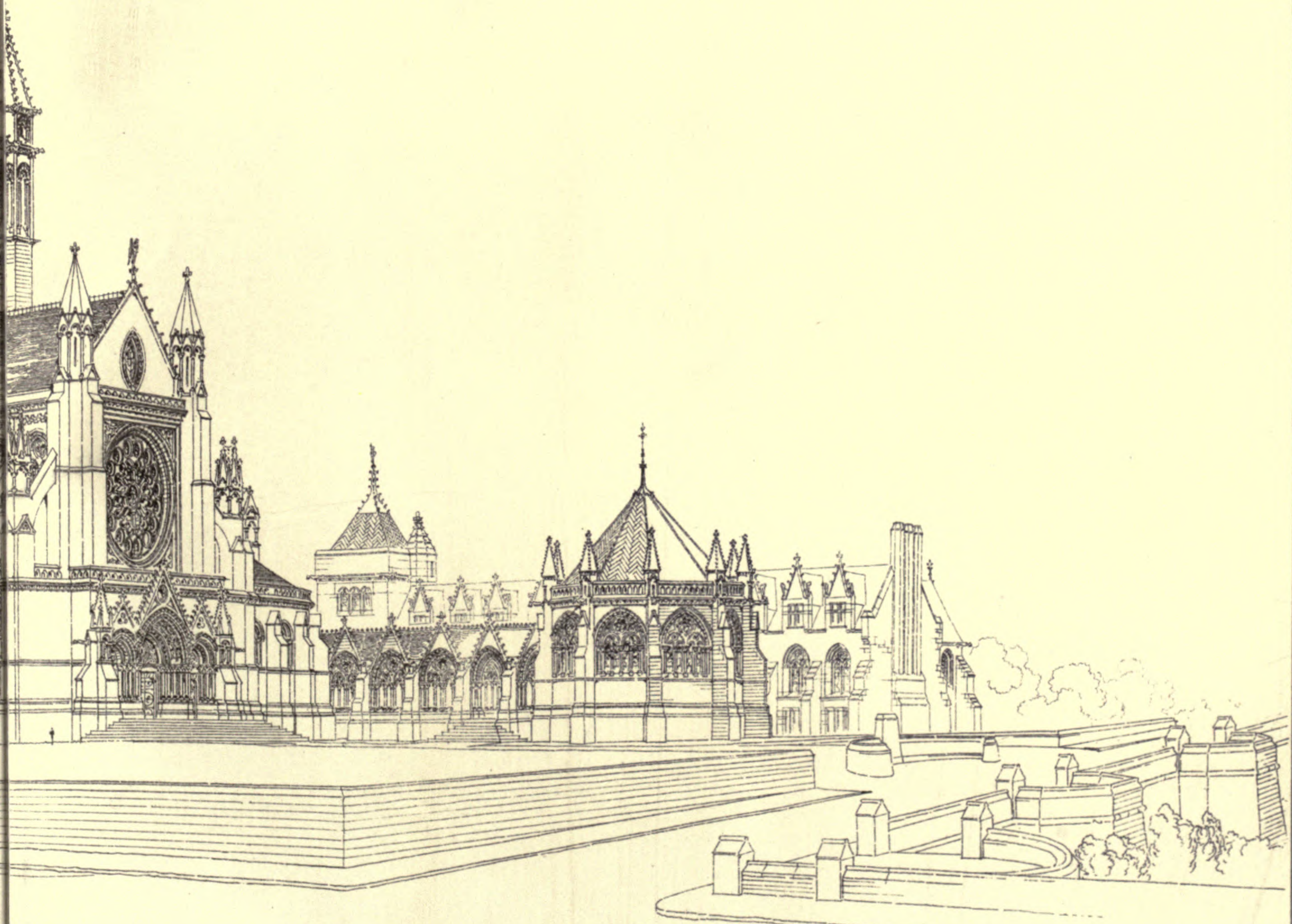
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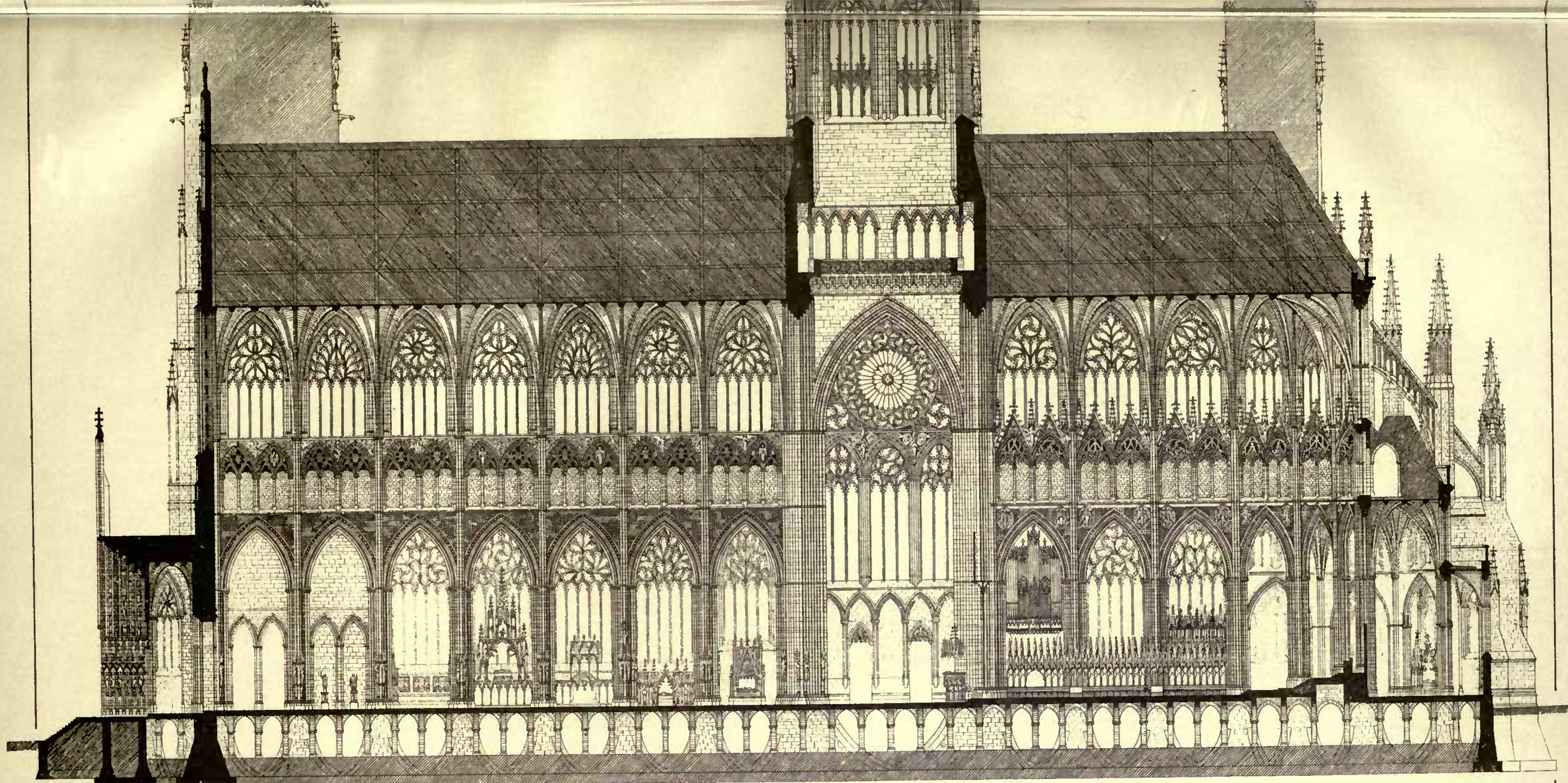




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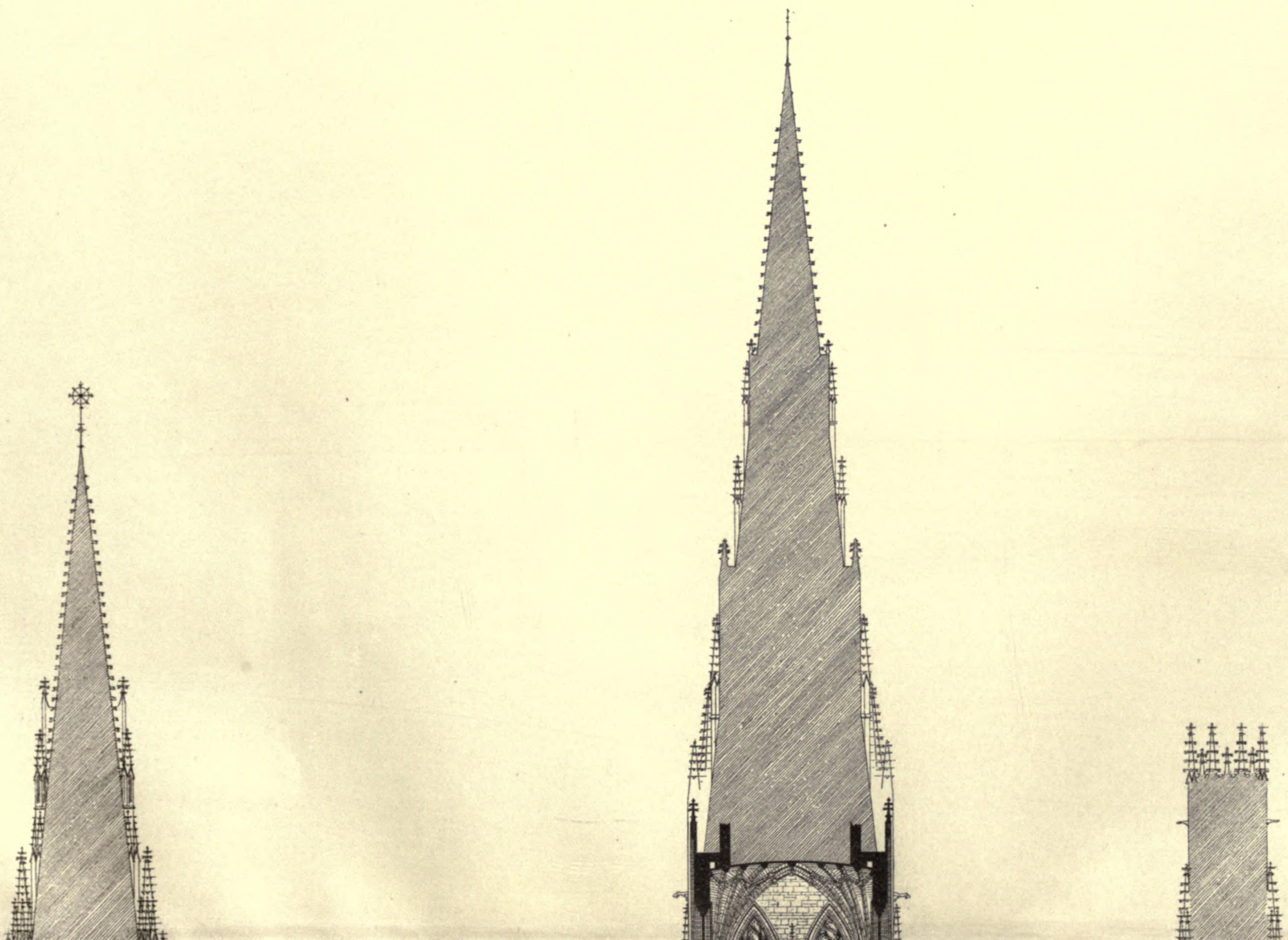
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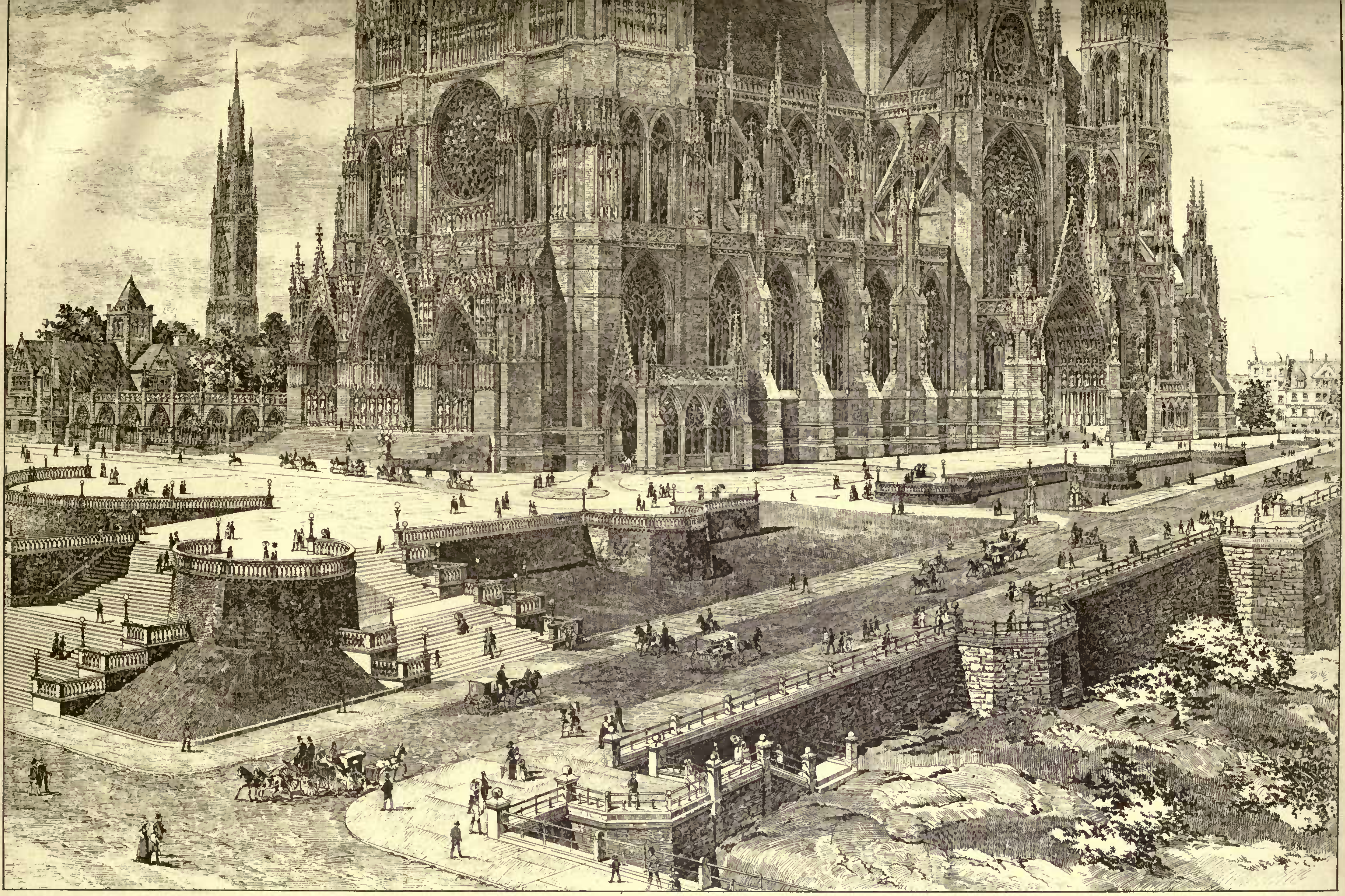
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"ARS LONGA VITA BREVIS"

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"Ars longa vita brevis"

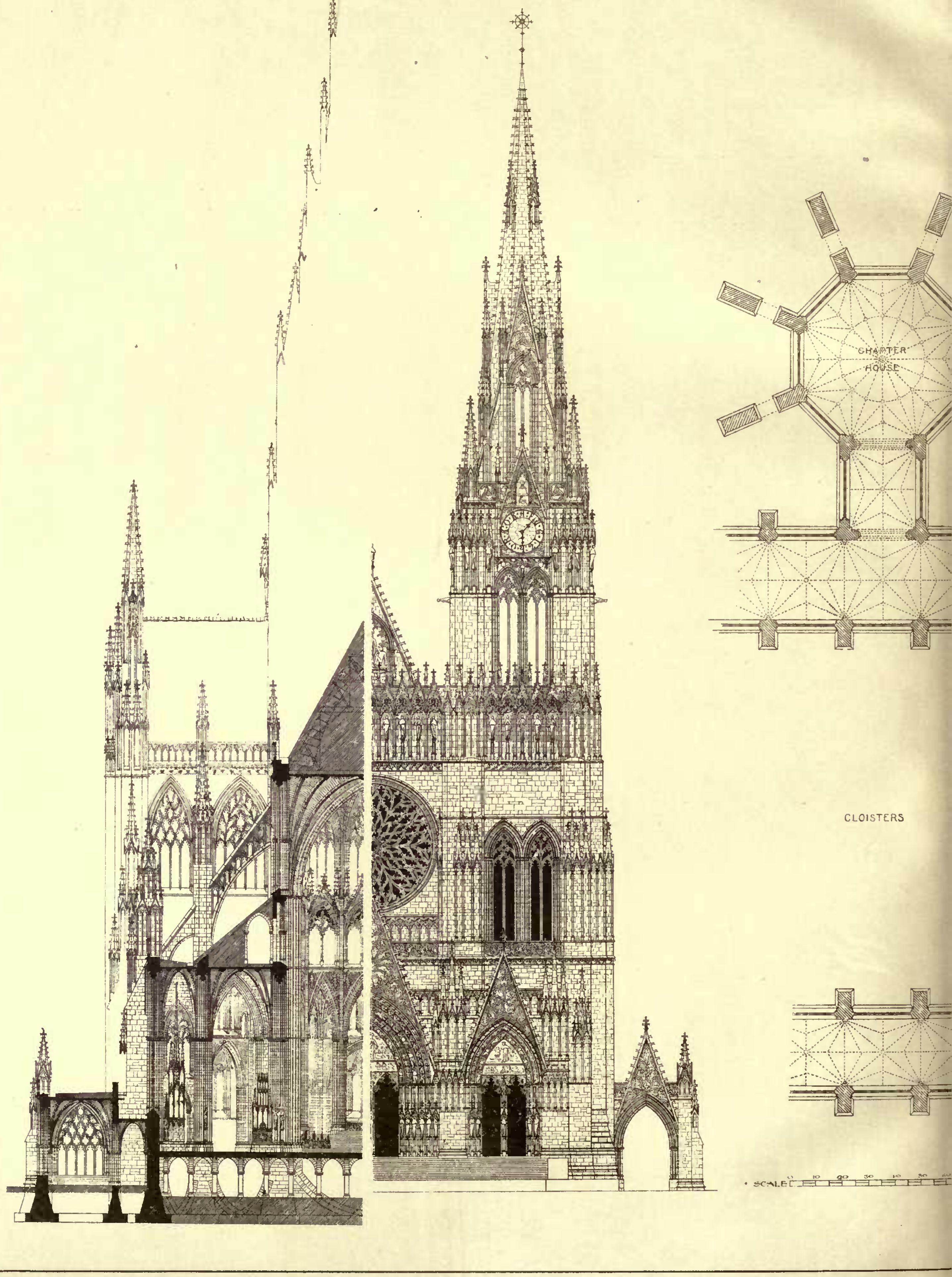
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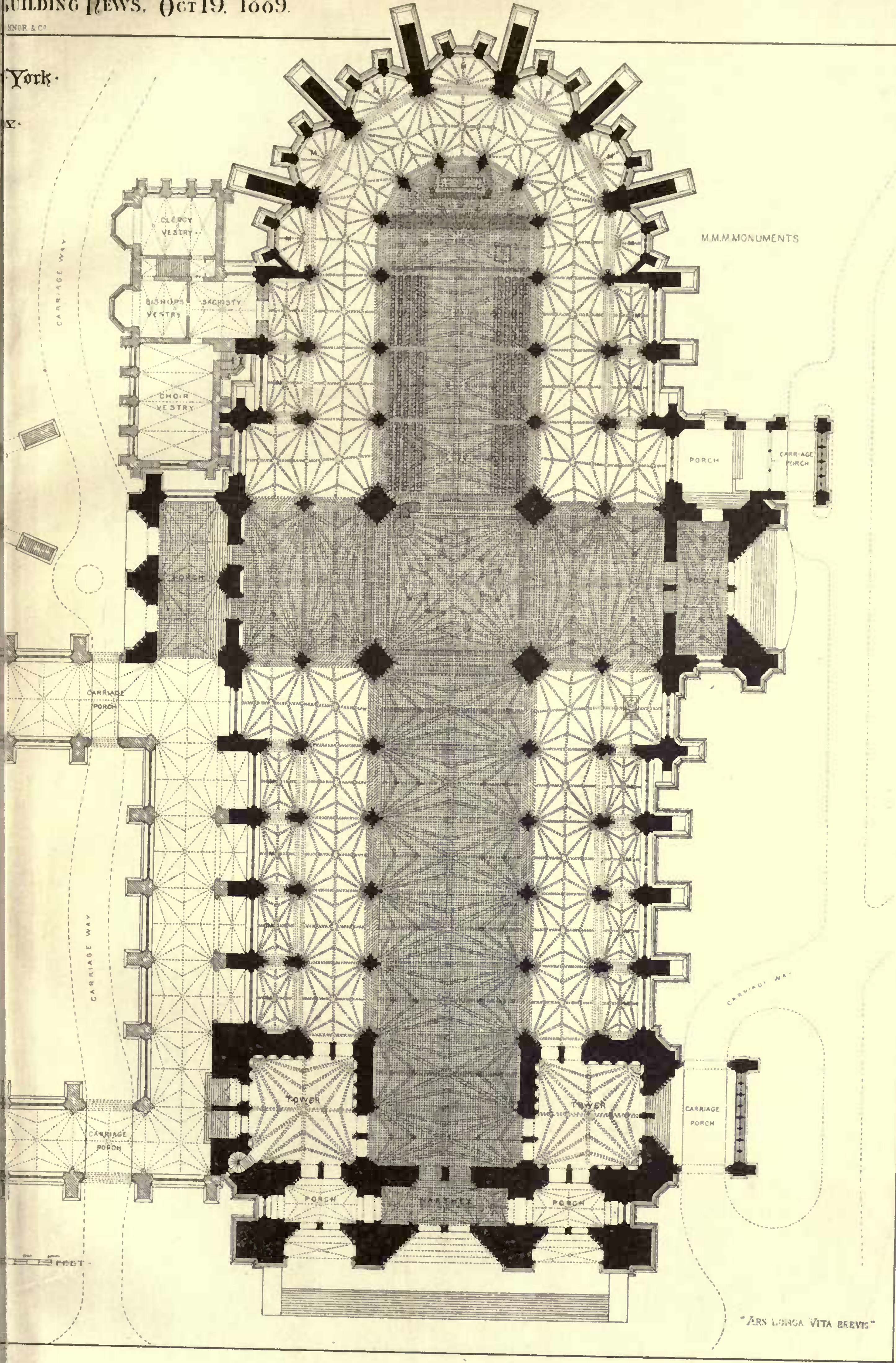
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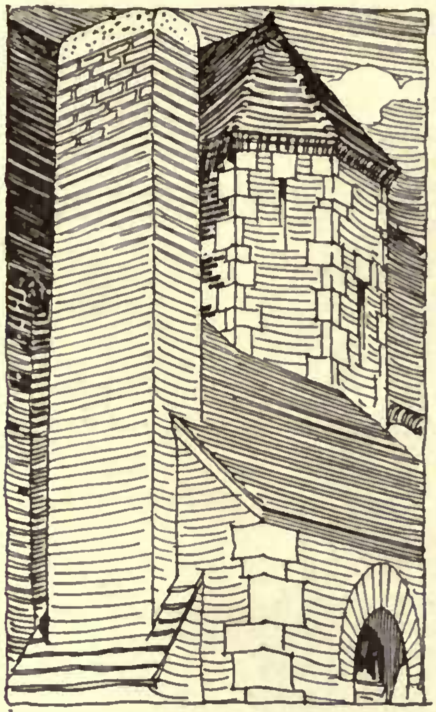
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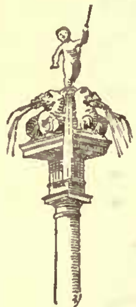


HOUSE OF ROGER WOLCOTT, ESQ., MILTON, MASS.

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FOUNTAIN NUREMBERG GERMANY



The Tyler-Davidson Fountain, Cincinnati, Ohio.



A Roman Fountain.



PUMP IN THE PALACE COURT MERSEBURG GERMANY.



Fountain in the Corso, Rome.



FOUNTAIN IN BASLE AFTER "ILLUSTRIRTE ZEITUNG"

FOUNTAINS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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OCTOBER 26, 1889.

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A DISCUSSION has lately been going on in *La Semaine des Constructeurs* about the responsibility of a builder or architect for defects in a building which come from following out the directions of the owner. It often happens, as we all know, that owners insist on following out their own whims, or the suggestions of their friends, in a way which is injurious to the stability of the structure on which they exercise their talent, and both architects and builders, knowing how hopeless it generally is to try to reason an owner out of a fancy in regard to a building, usually, as they say, "throw the responsibility on him," and quietly carry out his wishes with as much regard to safety and strength as practicable. We have before pointed out that, according to our law, this practice is highly dangerous for architects, and the French examples show that it is equally so abroad. According to a decision of the Fourth Chamber of the Court of Paris, dated November 8, 1886, it appears that if the owner of a building, being of mature age and capable of contracting, gives positive orders to have the work done in a certain way, the architect and builder, if they protest against these orders and refuse to carry them out, and only consent subsequently to do so on receiving a formal discharge, signed by the owner, from all responsibility for the consequences, are, by this refusal of obedience and subsequent discharge from responsibility, protected against pursuit by the owner on account of damage to his property resulting from carrying out his orders; but that even this does not release them from penal responsibility in case accident or injury to persons should result from executing the injudicious directions of another. As the owner undoubtedly has the right to discharge an architect who does not carry out his wishes, it will be seen that in this case, as in so many others, the architect has to steer with superhuman sagacity between rocks and whirlpools on both sides of his course. Just how threatening is the reef which threatens him on one side may be inferred from a still later French case. Three or four years ago, two builders, A & Son, constructed a house for Mr. B, who made his own plans and supervised the work. All the dimensions of walls, and so on, were given by Mr. B himself, who, moreover, ordered that the walls should be laid in lime-mortar, instead of cement. The house was hardly finished when it fell down, and the proprietor, as usual with such men, demanded that the builders should make good the loss. They refused, and, in the suit which followed, the Court of Aix, by decision of January 4, 1887, decided that as the builders had simply carried out the formal instructions of the proprietor, they were not responsible for the consequences. The case was appealed to the Court of Cassation, and by decree of October 23, 1888, the decision of the court below was reversed. The higher court held that "It is not sufficient, to avoid the responsibility of a constructor, to establish that he only carried out the plans, specifications and instructions of the proprietor. The architect or builder must *absolutely refuse* to execute the work entrusted to him under conditions which may compromise its solidity. By accepting these conditions, he adopts as his own the plans and specifications, and assumes, in consequence, the responsibility which the law lays upon him." This important decision, which, judging from cases here, we think would be fully sustained in our own courts, renders only too evident the folly of those complaisant architects and builders who will do anything that a meddling, fussy owner wishes for the sake of avoiding a quarrel with him. In no country is the profession of architecture so little esteemed as here, and in no country are architects and builders so injured, as well as tormented, by owners who think themselves capable of laying out and supervising their own buildings. We have hundreds of such owners, who go to an architect of reputation to "make them a sketch for a front," or "draw out their idea," and to a responsible builder to "do their work just as they want it done," and the architect of reputation and the responsible builder do what is asked of them, and then, as they suppose, wash their hands of the matter, never dreaming that each of them has made himself responsible for all the consequences of the owner's ignorance, folly or parsimony. There have been scores of cases here where the application of this principle of law, if the owner had thought of it, would have robbed architects and builders, of high and deserved reputation, of their last dollar, and a few conspicuous lessons of the kind may be needed before our architects and builders demand and take the position which the law gives them, that of men of science, who, in constructing buildings, are carrying out works of high technical difficulty, in which they have no right to excuse themselves for malpractice on the ground that they subjected their superior knowledge to the directions of an unskilled person, even though that person may have been the owner. A doctor would not be excused for poisoning a patient on the ground that the patient wanted him to administer strychnine instead of quinine, even though strychnine might be cheaper than the other medicine; and if architects and builders would remember that by being connected in any way, either by positive orders or not, with ill-considered plans, doubtful foundations, defective materials, careless or unskilful workmen or tricky contractors, they incurred frightful danger, and would act accordingly, they would find that instead of less, they would have more employment, and that their work would be far more satisfactory and profitable.

A CONCRETE floor fell recently in Berlin under curious conditions. In repairing the roof of a large military stable, it was decided to cover the building entirely with concrete, "after the Italian manner." A wire skeleton was prepared in the form of a series of vaults, which was to be covered with concrete, and, to prevent the concrete from falling through the meshes of the wire while soft, boards were put up beneath it, following the form of the vault. After the concrete had had three days to harden the boards were removed; but something seems to have interfered with the setting, for, on removing a certain portion of the boarding, the concrete over it fell for a space twelve or thirteen feet long, striking the workmen engaged under it, and severely injuring three of them.

THE Administration of the Paris Exhibition has been very liberal of its recompenses to the architects who showed their work. Besides such men as Waterhouse, Garnier, Vaudremer, and so on, who, being on the jury, were excluded from competition, grand prizes were awarded to Mr. Collcutt, of England, architect of the new Imperial Institute, Mr. Norman Shaw, M. Schadde, of Belgium, and MM. Chipiez, Formigé, Daumet, Ginain, Lheureux and Paulin, of France. Gold medals were awarded to many distinguished French architects, and to Messrs. Douglas & Fordham, and Webb & Bell, of England; and silver medals to William Emerson, the author of the most noted design for the Liverpool Cathedral, and two other English architects. No recompense was awarded to any American architect, probably for the simple reason that none exhibited.

THE newest thing in school-houses comes, as usual, from Germany. Not content with the provision of a gymnasium for every school-house, as is now the law in Switzerland and most parts of Germany, the new public schools in Weimar and Göttingen are furnished with baths for the pupils. In that at Weimar, the baths are placed in the basement, in vaulted rooms, plastered with smooth cement, and floored with asphalt, over which is a lattice platform of wood; and places for hanging clothes are provided near. The baths consist of showers, supplied with hot and cold water, under each of which is a round zinc dish, large enough to accommodate three children. There are seven of the showers, so that twenty-one pupils can be bathed at once, and the entire school thus washed up very expeditiously. Considering that the scholastic bath is probably the first and only one which most of the pupils ever undergo, there is certainly an advantage in giving them an opportunity for one such experience. In our hot climate, particularly, a tri-weekly shower-bath all around for the scholars of city schools would conduce immensely to their health and comfort, but it would probably need German absolutism to induce their parents to consent to what thousands of them believe to be a dangerous and unnatural experiment.

THE *Bautechnische Zeitung*, in answer to a correspondent who inquires for a formula for determining the thickness of walls, gives Rondelet's rule, which it declares to be still the best, and adds some observations of its own, which are of value. Most of our readers probably know Rondelet's rule, by which, as given in his book, the height of the proposed wall is to be drawn, at any scale, as a vertical line, and its length, between cross-walls or buttresses, on a horizontal line, drawn from the foot of the vertical. For "medium stability," the vertical is then to be divided into ten equal parts, and with one of these parts as a radius, and the top of the vertical as a centre, an arc is to be drawn; the top of the vertical, and the farther end of the horizontal line, are then to be connected by a diagonal line, and a second vertical is to be drawn through the point where this diagonal intersects the arc drawn just previously. The space intercepted between the first and second verticals will represent the proper thickness of the wall at the given scale. The same result is arrived at algebraically by solving the equation $T = \frac{L\,H}{n\sqrt{L^2 + H^2}}$, T being the thickness required, L the length of the wall between cross-walls or buttresses, H the height, and n a constant, which will be 10 for a brick wall of reasonable stability. Extending this formula to cover walls of other materials, the *Bautechnische Zeitung* finds that with perfectly cut stone — the "ashlar" of the English masons — the wall may safely be thinner than with brick, so that n may in this case be taken at 12. With splitstone the wall must be thicker, n being not more than 8, and for rubble it should be 6, or even less. If walls are exposed to strong winds, they should be thicker, especially if long, than in sheltered situations, and a wall laid with inferior mortar should be thicker than one in cement.

THE destruction by rust of two of our great ironclad ships, which were recently found with their hulls corroded entirely through, calls to mind an ingenious application of voltaic electricity, by which the English ironclads are now successfully protected. Taking advantage of the fact that when a battery is formed of iron and zinc in a corroding solution, the zinc is most readily acted upon, many of the later ships have their iron hulls cased with boards, over which are nailed sheets of zinc. At intervals, through holes in the boards, connection is made between the two metals. On exposure to the action of sea-water, it is found that the zinc is dissolved away, and must be periodically replaced, but so long as any zinc remains, the iron under it is perfectly protected against rust, by the transfer of the chemical action to the zinc. According to *Le Génie Civil*, zinc is also rapidly taking the place of copper for sheathing wooden ships. Although much more readily corroded in the air, it is found that, when submerged in sea-water, zinc will last at least as long as copper, while it costs only about one-fourth as much. The same article gives a curious account of the early manufacture of zinc. It seems that, although the various ores have been in use since very ancient times, the metal was only discovered in 1806, and the discovery was made in obedience to an order from the first Napoleon. Since the Middle Ages, the mines of Vieille-Montagne, in Belgium, had furnished calamine, a native oxide of zinc, which was used for making brass, by heating copper, calamine and charcoal together in crucibles. On the annexation of the Belgian provinces to the Republic of France, in 1795, the Vieille-Montagne mines were appropriated by the Government, and worked, with very indifferent success, until 1806, when the Emperor handed them over to a Belgian chemist, Daniel Dony, under a concession which made it obligatory on him to endeavor to extract from the calamine the metallic base which it was suspected to contain. As zinc is very volatile, all Dony's attempts to reduce it from the ore by melting with charcoal and fluxes in crucibles proved unsuccessful, for the reason that the zinc flew, unobserved, up the chimney as fast as it formed in the crucible. After trying in vain to do what the Emperor required of him, Dony finally determined to arrange a reverberatory furnace, in which he could raise the mass in the crucible to a temperature higher than any he had previously attained, thinking that if he could only get it hot enough, he might still succeed. When all was ready, in order to be able to see what was going on in the furnace, he made a hole in the side of the cupola, and inserted a flower-pot, with the rim inward, so that he could use the hole in the bottom of the pot as a loophole for observation. The fire was kindled, and, as before, the zinc, when it became hot enough, began to fly up the chimney, but, on the way, some of the fumes drifted into the flower-pot, which, being exposed to the air, was cooler than the rest of the furnace, and there condensed, and Dony, on looking through the hole, to see if there was any appearance of metal in the crucible, was amazed to find drops of melted zinc trickling down the sides of the flower-pot, close to his nose. The mystery being thus solved, the distillation of zinc from the ore became an easy process, and, even yet, the list of purposes to which this cheap and useful metal can be put is by no means exhausted.

THE Eiffel tower was struck by lightning the other day, and the scientific observers who were stationed for various purposes in the tower had an excellent opportunity for studying that sort of phenomenon on the spot. The summit of the tower is protected by a lightning-rod, with a heavy point of bronze, tipped with platinum, and eight other points project obliquely from the level of the third platform. The upper point had shown signs of a dangerous vibration in high winds, and had been removed, leaving the end of the rod, with only the screw-threads cut on it, projecting above the top of the tower. About ten o'clock one evening, while the managers of the electric-lighting were busy about the enormous groups of arc lights placed in the top of the tower, a terrific clap of thunder was heard, and the lightning was seen from the outside to strike the summit, while, at the same instant, as well as repeatedly afterward, crackling sounds, accompanied with streams of light, were perceived around the undisturbed points at the gallery level. The people in the tower experienced no shock or inconvenience of any sort, but those standing outside on the galleries thought it prudent to get inside without delay. Immediately after the lightning, a cloud descended around the upper portion of the tower, and, being strongly illuminated by the huge arc-lamps, gave persons in the neighborhood the idea that the top of the structure was encompassed with electric flames, which, as was reported, "surpassed in brilliancy the lamps themselves." At the instant of the flash, red sparks were seen to fly from the tip of the upper conductor, and, on examination, it was found that the screw-threads were in places partly obliterated, apparently by melting, and it was necessary to restore them with a file before the point could be screwed on again.

A NEW artificial stone is coming into use in Germany, which, instead of the dull, darkish gray inseparable from the compounds of Portland cement, is almost perfectly white, being made of white sand and a new white cement. What this white cement is composed of we can only conjecture. It may possibly have magnesia in its composition, like some other strong white cements; but, however that may be, it seems likely to be useful. The greatest objection to the artificial stones made of Portland cement has hitherto been their color, and a stone equal to them in hardness, and of a white or light color, is much to be wished for.

EQUESTRIAN MONUMENTS.[1] — XXII.

JOAN OF ARC.



Campanian Horsemen found near Capua. After Menard's "*La Vie Privée des Anciens.*"

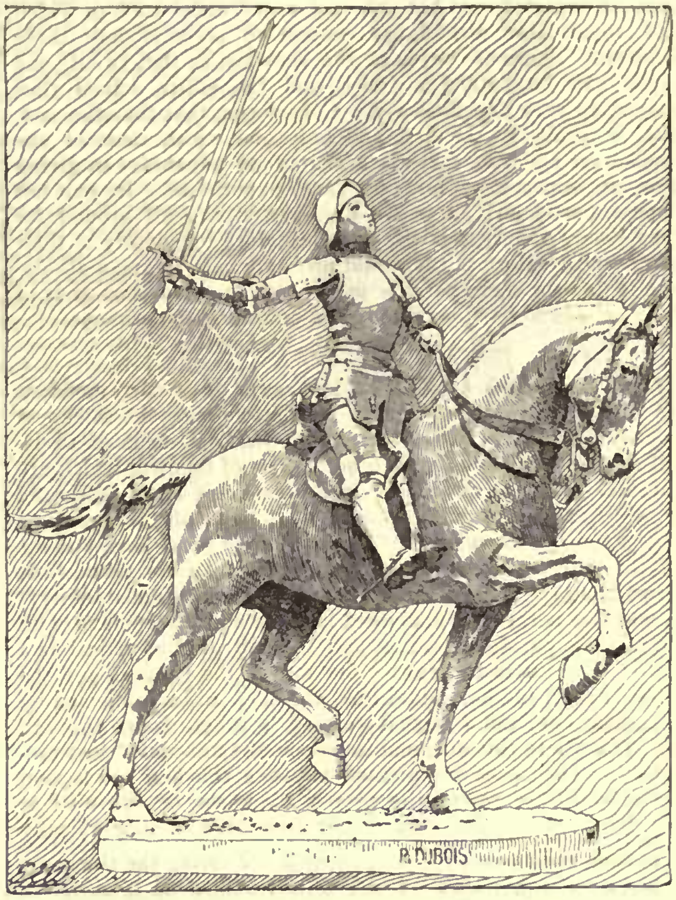
THE possession of a fine artistic conscience, so to call it, must be considered one of the attributes of an artist of high rank, and if Emmanuel Fremiet had no other claim to a high place in the ranks of sculptors, whether ancient or modern, an undertaking which he has this year accomplished should surely make good any pretensions he or his friends might put forward.

Holding an honored place in the Paris Exhibition this year may be seen a full-size cast of an equestrian statue of the Maid of Orleans, which has a familiar air to all lovers of statuary who see it — so familiar that the less observant probably wonder how it is that a cast of a comparatively old and well-known equestrian group finds a place in an exhibition which is supposed to illustrate only the advances that manufacture, science and art have made during the last decade. These observers, of course, imagine that the group before them is only a replica of the famous statue of Joan of Arc in the little Place des Pyramides, just off the Rue de Rivoli in Paris, where it is seen by every visitor to that city. Occasion has already been taken to speak of this group in the Place des Pyramides as, in many ways, the most satisfying piece of equestrian sculpture, after the "Colleoni" at Venice, that has been produced since the days of the ancients. But the very fact that it is so good has made it the target of a great



New Model of Joan of Arc. E. Fremiet, Sculptor.

deal of criticism, and apparently the sculptor has found that in some things the critics were in the right, and has come to feel that there were points in which his original conception was defective. Feeling thus, Fremiet, though long past the prime of life, found that he could not believe himself a true artist if he did not do something to rectify his errors, and so determined to undertake at his own expense and of his own volition the laborious task of remodelling the entire group. If he had frankly abandoned his original conception and set out to create one entirely different from it, the undertaking would have been hardly more notable than if he had set about producing a statue of some personage he had never modelled before. But this was not the case: he was satisfied with the original conception; the manner in which he had given it expression was what caused him discomfort. Consequently, his task involved a vast amount of drudgery, which had to be undertaken for the sake of securing the new expression he



Joan of Arc for Rheims. P. Dubois, Sculptor.

sought, which could only be added in the final stages of the work. These changes are so little obvious, so subtile, that it is not to be wondered that most observers are unconscious that they exist; and yet, should the old and new statues be placed side by side, they would be detected easily enough.

Bastien-Lepage's wondrous painting of Joan of Arc, for a long time at the Boston Museum of Fine Arts, and now in the Metropolitan Museum in New York, has taught us how powerfully a story may be told by the intensity and quality of facial expression, and it was mainly to secure this quality that Fremiet's new model was undertaken. The Joan of the original statue represents a girl of the right age, of the proper social class, and possessed with a determination to carry out her aims; but it is just here that the original falls short of satisfying the ideal. The determination which the statue evinces is one created by external circumstances. Joan is represented here as a girl who has seen with the eyes of the flesh certain wrongs inflicted by a higher human power upon her neighbors and fellow-beings of the same class, and the ordinary instincts of a courageous human being, whether male or female, have induced her to champion the cause of her down-trodden fellows. The quality of intellectual inspiration, so conspicuous an element in Bastien-Lepage's painting, is wholly unexpressed, and it was almost entirely for the sake of giving expression to the internal promptings of a mind affected by a devout superstition that Fremiet found it worth while to devote so much time and labor as the execution of the new model involved. The addition of the frontlet to the horse and the few minor changes in the modelling of the animal may or may not give an added value to the whole, but few can fail to appreciate the fact that the severe and absorbed countenance of the new Joan is a better interpretation of character than the face of the plump and jocund little girl of the original group, with her features puckered into as close an approximation of grim determination as the habitual good nature of the French peasant will allow.

It is not unnatural that Fremiet should have gone slightly wide of reaching the fullest expression of his conception, for, as a sculptor whose specialty is the modelling of animals — and he is known as the greatest *animalier* of modern times, he was probably more occupied in giving expression to the horse than intent on revealing the workings of the inner spirit in the countenance of the rider. Other sculptors who have taken Joan of Arc for a subject have been

[1] Continued from page 173, No.720.

more observant of the desirability of giving greater expression to the legend which asserts that Joan was affected by a divine inspiration, and a chief part of their endeavor has been to typify the devotional attributes of her character. At the Paris Exhibition is also shown a cast of another equestrian statue of Joan of Arc, by Paul Dubois, who has taken especial care to signalize the devotional side of Joan's nature by the character of expression with which he seeks to inform her features. The maiden is here represented not as feeling the first pressure of inspiration, as Bastien-Lepage shows her, and not under the impulse toward the physical accomplishment of her purpose, as Fremiet, in his earlier statue, represents her, but as under the influence of a calm and devout satisfaction at the accomplishment of the task which she had imposed upon herself. With eyes upcast she returns thanks to God, or seeks the applause of spirits above her that other earthly eyes cannot see. But for all that, and for all the care, skill and painstaking the sculptor has bestowed on his task, he has given us not the Joan of history, but a meek-spirited and gentle-faced nun masquerading in armor and flourishing a large sword in the most meaningless and helpless manner. What the precise connection of such a gesture with the dumb utterance of a pæan of thanksgiving is, it is hard to discover.



Wooden Statuette of Joan of Arc in the Musee de Cluny, Paris.

This statue, whose execution was brought about by the Academy of Rheims, is to be set up in that city as a tribute to the memory of the heroic girl who captured the city from the English after many years' occupation by them, and made it possible for Charles VII to be there crowned King of France. The choice of the sculptor seems to have been somewhat determined by the fact that the Academy had learned that Dubois had long had it in mind to model such a statue, had done some preliminary work on it, and was only waiting the encouragement of a definite commission to go on with it.

While it is not fair to argue that the sculptor erred in arming Joan with a sword, since the myth has it that she was provided with a sword of mystic powers — the sword of Fierbois, whose hiding-place was revealed to her in a vision — yet she herself often said that she loved her standard "forty times more than her sword," since her woman's might flourished it with more ease than the homicidal weapon, and it did far more to inspire her followers. For a statue that was to be set up in Rheims, the standard in her hand would have had peculiar significance, since one of the counts in the indictment on which she was tried at Rouen recited that she had dared to carry her standard into the cathedral and hold it upright at the side of the high-altar during the ceremony of crowning the dauphin. Possibly the reason that Dubois displaced the standard in favor of the sword was to differentiate as much as possible his work from Fremiet's.



Bronze Statuette of Joan of Arc in the Collection Odiot. From the *Gazette des Beaux-Arts*.

Earlier sculptors recognized the close association between Joan and her oriflamme, and, though the wooden statuette in the Musée de Cluny holds neither sword nor staff, the position of the right arm is evidence that this earlier and probably contemporary piece of sculpture showed Joan carrying her long and narrow white pennon, blazoned with the Deity between kneeling angels, and the words "Jhesus Maria" on one side, and on the other side the arms of France on a ground strewn with *fleurs de lis*. This statuette is painted, the horse white and Joan's armor black, relieved with gilding. It has the peculiarity that on sliding the armor over the left knee a cavity is disclosed, which is supposed once to have contained a precious relic of the Maid herself. It is unquestionably a work of the fifteenth century, and its authenticity as representing the personage whose name it bears was supposed to be beyond dispute. But recent investigations by M. Paul Quesvers make it appear that it is rather a statute of St. Maurice, chief of the Theban legion: the real history of which is as follows: The Church of Nôtre Dame et Saint-Loup de Montereau-fault-Yonne for a long time had a statuette of St. Maurice which had come to it from the Church of St. Maurice, at Montereau, which was destroyed during the Revolution. The statuette long used during processional rites had fallen into decay, so that when in 1872 a nameless jobber who had been employed in cleaning and renewing the decorations of the church refused payment, but said he would take instead the disreputable little statuette, the *curé* thought he had made a most excellent bargain. The new owner, after having cleaned and repainted the peculiar guerdon which had momentarily struck his fancy, laid it aside and thought no more of it, until one day when one of those bric-à-brac dealers who travel up and down over the face of the Continent in search of real or spurious *objets de vertu* visited him, when it was produced, and changed owners for the modest price of ten dollars. A fortnight later the dealer visited M. du Sommerard, the director of the Musée de Cluny, and for one hundred dollars sold little Saint Maurice to him as a veritable Joan of Arc, with a record of authenticity behind her which, in the eyes of the director, convinced him that he had made a wonderfully cheap purchase. Perhaps one story is as good as the other. At any rate the statuette has since then been known, and possibly always will be, as a Joan of Arc.



Joan of Arc. A. Le Veel, Sculptor.

But there is nothing that affects the credibility of the record attaching to another fifteenth-century, bronze, statuette of Joan of Arc in the collection of M. Odiot, once in the Collection Carrand,



Joan of Arc. The Princess Marie d'Orleans, Sculptor.

and here, at least, there is no question but that she bears her beloved standard, and not the sword.

The statue at Orleans, by Foyatier, is more on a plane with Dubois's than with Fremiet's work, and is less satisfactory than either, because of the ineffective and capricious pose of the horse, who is evidently more intent on selecting a nice, soft spot to roll on,

than impressed with the necessity for restraining his equine spirits until the preoccupied damsel has no further need of his services. The sculptor seeks to personify the inspired character of his subject by an upturned face, which, considering the uncertainty as to what her horse will do next, adds nothing to the restfulness of the group, and only fills the observer with anxiety as to what will befall so careless a horsewoman. The salute, which Joan seems to be executing with lowered sword-point, is a better gesture than the meaningless flourish which Dubois's figure is to sustain uncompleted for so many years.

Since writing this, news has been received that the authorities have declined to substitute Fremiet's new Joan for his earlier work, and he has, in one sense, labored in vain; but he has satisfied his conscientious scruples, and may, perhaps, take comfort in the feeling that, after all, he probably knows better than the authorities which is the better statue of the two. And he has the further gratification that the new statue has been eagerly sought by the people of Nancy, to whom he has offered it for $3,500, by a city in Lorraine, and by Philadelphia, which last is reported to have secured it, as they, the Philadelphians, had already put in a bid for the original statue, in case it should be discarded in favor of the later study. If this story be true, Philadelphia will soon be able to boast the possession of one of the best pieces of equestrian sculpture in the world.

It does not appear whether Joan contented herself solely with leading and inspiring her followers by her mere presence on the field, or whether, as she was physically a very robust young woman and at one time wore her heavy mail for six days and nights without removing it, she actually indulged in the work of the common warrior



Joan of Arc. The Count du Passage, Sculptor. From *L' Art.*

during a hot engagement: it is certain, however, that she was often in the thick of the fight, and she and her oriflamme must have been frequently singled out for special attack, as all flag-bearers always are, and consequently she was often exposed to bodily peril and received some hard knocks. It may be supposed that Le Véel selected such a moment as this as one sufficiently typical of his heroine, when he modelled the equestrian group which was first exhibited at the *Salon* of 1867, in plaster, at small scale, and again at full-size in bronze in 1880. This is not a girl merely inspired with superstitious devotion, it is no nun or sister-of-charity in armor, but a thoroughly aroused human young woman, whose helmet has been swept away by a blow, leaving her short-cut hair dishevelled, forgetful of her unfeminine surroundings, and intent only on keeping so far in the van that she shall be a lode-star to her followers struggling after. It is not a very agreeable conception, but is certainly executed with abundance of animation. It clearly shows the subject acting as a young woman of her class might be expected to act, when her blood was moving so rapidly as to drive from her mind for the moment the belief that she was acting under divine inspiration.

To the masculine mind it has seemed most important not to lose sight of the femininity of the heroine, and it has remained for a sculptor of the gentler sex to present the Maid in the guise of a warrior actually doing a warrior's work. To the Princess Marie, daughter of Louis Philippe, herself a Maid of Orleans and an artist of ability, the character of Joan appealed with peculiar force, and she modelled the heroine under several guises. One of these, a pedestrian figure, is well-known, and may be seen not only at Versailles but also at Orleans, where it stands beside the steps to the Museum. Besides this figure she modelled an equestrian statuette, which, before her death, was exhibited to only a favored few. After the death of the Princess at the recurrence of the fête day of Joan of Arc on May 3, 1855, the Queen Amélie presented a bronze cast of this statuette to the city of Orleans, and it is now placed in the museum there. The statuette is curious and interesting because of its history, and as a piece of sculpture is one which shows that the Princess might have made her mark in the ranks of artists even without the aid of birth. Joan is here shown as looking down regretfully at the body of an English soldier she has just slain, and, as becomes her in this warrior *rôle*, she bears her sword and not the standard, though her other accoutrements seem to promise inadequate protection to even a robust female amid the turmoil of hand-to-hand conflict. The horse is well rendered, and shows the agitation that a sensitive animal would naturally show at the sight of strife, and with the unwelcome scent of blood in his nostrils.

One other equestrian statue of the Maid is conceived in a somewhat similar vein, but here the sculptor seeks the aid of allegory, and preserves the femininity of his subject by making the horse the actor, and thus leaving the rider, who here again bears her standard, still removed from doing any overtly unwomanly act. In those days the arms of England showed the leopard — not the rampant lion of these later times — and the Count du Passage shows the horse trampling upon a defeated and writhing leopard, while Joan gazes upward in triumph.

JOAN OF ARC. — Joan of Arc, or more properly Joanneta Darc, afterwards known in France as Jeanne d'Arc, the Maid of Orleans, was born about 1411, the daughter of Jacques Darc, peasant proprietor of Domremy, a small village partly in Champagne and partly in Lorraine. Joan received her sole religious instruction from her mother. In girlhood she was noted for her great physical energy, skill in all household work, exemplary conduct towards her parents and unselfish kindness to all. These qualities of mind and body were accompanied by intense mental activity and an abnormally sensitive nervous temperament. As she grew older she became inclined to silence, spending much time in solitude and prayer, and repelled all the advances of the young men of her acquaintance. At this time the English had extended their conquest over the whole of France north of the Loire, as well as Guienne, and while the infant Henry VI of England had, in 1422, been proclaimed King of France at his father's grave at St. Denis, Charles the Dauphin, given over to ease and luxury, was almost passively contemplating the slow dismemberment of his country by internal confusion and misery, and by the victories of the English. The fact that many of these misfortunes were owing to the conduct of his mother Isabella, who disinherited her son in favor of Henry V of England, the husband of her daughter Catherine, lent color to the ancient prophecy of the enchanter Merlin, that the calamities which should fall upon France through the depravity of a woman would be removed by the deeds of a virgin. In Joan's own country the tradition obtained that this virgin should come out of the forest of Domremy, where she tended her father's sheep. It is easily seen how, in such a time, this belief became the overpowering passion in a mind like hers, at once strongly sympathetic, ardently patriotic and full of a vivid imagination, until she was convinced of her high destiny, and, at last, all her waking hours were one prolonged prayer for her country's deliverance. Owing to a peculiarity in her nervous constitution, her own thoughts and hopes seemed to take audible voice and returned to her as assurances and commands spoken to her by the saints, which, when in 1428 Orleans, the key to southern France, was invested by the English, became so urgent as to overcome all pretexts for delay on account of previous discouragements and rebuffs. In spite of the remonstrances of her parents, therefore, she, after renewed efforts, succeeded in obtaining an introduction to Charles from Robert de Baudricourt, governor of Vaucouleurs, and in February, 1429, set out on her journey to the French court at Chinon, accompanied by two knights, her avowed mission being to relieve Orleans and crown the Dauphin at Rheims. At first, Charles would not see her, but popular feeling induced him to do so, and she finally persuaded him of the divinity of her commission, and was allowed to set forth with an army of 4,000 or 5,000 men for the relief of Orleans. At their head she rode, clad in a coat-of-mail, armed with an ancient sword which she had divined to be hidden near the altar of St. Catherine de Fierbois, and carrying a white standard of her own design embroidered with lilies, and having on one side an image of God seated on the clouds and holding the world in his hand, and on the other a representation of the annunciation. Joan was of medium height, stoutly built, but finely proportioned, and her frame was capable of enduring great fatigue. She does not seem to have been handsome in countenance, her face being, however, of pleasing aspect, with fine eyes, and she possessed a voice of great power and sweetness. Nominally she had been entrusted with the command of the army, but in reality it was under the direction of experienced generals: and it cannot be pretended that the victories won in consequence of her coöperation were the result of brilliant military genius. Indeed, she was blindly obstinate in refusing to acknowledge defeat in the face of overwhelming odds, and was actuated throughout by a fatalistic persuasion that victory was sure if she persisted. At the same time she had a shrewd and penetrating judgment of men and things, and in all her varied difficulties her manner showed extraordinary force of character, and a high and noble prudence. What, however, she chiefly supplied to the French cause was concentrated energy and resolution, and above all, she inspired the soldier with a fanatic enthusiasm, and overawed the enemy through their fear of her alleged supernatural powers. She succeeded in entering Orleans on the 29th April, 1429, and at last forced the English to raise the siege ten days later. The capture of Jargeau and Beaugency was followed by the great victory of Patay, where Talbot was taken prisoner, and the English were driven beyond the Loire. The king then set out towards Rheims, which he entered with 12,000 men on July 16, Troyes having on the way been taken by assault. The next day, holding the sacred banner, Joan stood next to Charles at his coronation in the cathedral. The capture of Paris was then attempted, but on account of the disastrous result of an attack made on September 8, in which Joan was wounded, Charles, in spite of her passionate remonstrance, withdrew from the city and disbanded his troops. Joan went to Normandy to assist the Duke of Alençon, but returned to the court in December, when she and her family were ennobled with the surname of du Lis. In the next March she left the court to assist in the defence of Compiègne, against the Duke of Burgundy, who was in league with the English, and on May 24 led an unsuccessful sortie against the besiegers, when she was surrounded and taken prisoner. Charles made no effort to save her, and she was at last sold in November by Burgundy to the English, who, on January 3, 1431, at the instance of the University of Paris, delivered her over to the Inquisition for trial. After a public examination, begun January 9 and lasting six days, and another one conducted in the prison, she was on March 20, publicly accused as a heretic and sorcerer, and being found guilty, made her submission at the scaffold on the 24th of May, and received pardon. She was still, however, the prisoner of the English, and, having been induced by those who had charge of her to resume her male attire, she was on this account judged to have relapsed, was sentenced to death, and burned at the stake at Rouen, May 30, 1431. Her sentence was revoked by the pope in 1456.

DUBOIS. — Paul Dubois was born at Nogent-sur-Seine in 1829. In early life he began to fit himself for the profession of the law, but was constrained by his artistic tastes to devote himself to sculpture, and studied in Paris under Armand Toussaint, afterwards spending several years in Italy. His "Infant St. John," "Narcissus" and "A Florentine Singer of the Fifteenth Century," are in the Luxembourg. Dubois's most important work is the monument to General La Moricière in the Cathedral at Nantes. His other sculptures include "Eve"; a group of the "Virgin and Child"; an equestrian statue of the Constable Anne de Montmorency for the Château of Chantilly and a number of portrait busts, among

them being those of Baudry, Pasteur, Bonnat, Cabanel and Gounod. Dubois is also a painter in oil of much talent, and has produced some admirable copies of the old masters and many excellent portraits. He has won many medals and other honors.

FOYATIER.—Denis Foyatier was born at Bussière in 1793, and studied under Lemot. He executed a number of monuments, among which may be mentioned statues of the Abbé Suger for Versailles; of Colonel Combes for Flers; of Major Martin for Lyons, and of Martignac for Miremont, together with various works for churches and other other public edifices, and a quantity of portrait busts. His ideal works include "Spartacus"; "Germanicus"; "The Shepherd Amaryllis"; "Love"; "The Athlete Asidamas saving a mother and child from destruction at Herculaneum"; "St. Cecilia" and "The Immaculate Conception." Foyatier died in Paris in 1863.

LE VEEL.—Armand Le Véel was born at Bricquebec, and was a pupil of Rude. His works include an equestrian statuette of General Marceau and one of Francis I; an equestrian statue of Charlemagne; an equestrian statue of Napoleon I, at Cherbourg, and several portrait busts.

PRINCESS MARIE.—The Princess Marie d'Orléans, a daughter of Louis Phillippe, was born at Palermo in 1813. Having evinced a remarkable disposition towards the fine arts, she was given lessons in painting by Ary Scheffer and in sculpture by David d'Angers. In 1837 she married Duke Alexander of Würtemberg, but was taken ill the following year and died at Pisa in 1839. Her best-known work is a marble (pedestrian) statue of Joan of Arc now at Versailles (a bronze replica being in front of the Hôtel de Ville at Orleans); but she also executed a "Death of the Chevalier Bayard," and a marble figure of a praying angel, which is placed in the Chapel of St. Ferdinand in Paris, erected by Louis Philippe in memory of her brother Ferdinand, Duke of Orleans. In the chapel at Fontainebleau is a stained-glass window made from her design, of St. Amalia, the patroness of her mother, Queen Amélie.

PASSAGE.—Marie Gabriel Arthur, Vicomte du Passage, was born at Frohen and studied under Barye. He has exhibited various sculptures of animals at the *Salon*, including a group entitled "The Steeple-Chase: Jumping the Barrier"; a "Picardy Smuggler"; a "Hunting Mare and Groom"; a "Gaul carrying a wild-boar"; a "Gaul returning from the Chase," and "The Relay."

[To be continued.]

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

JOAN OF ARC, ORLEANS. D. FOYATIER, SCULPTOR. JOAN OF ARC, PARIS. E. FREMIET, SCULPTOR.

[Gelatine Print, issued only with the Imperial Edition.]

COURT-ROOM FURNITURE. MR. A. H. STEM, ARCHITECT, ST. PAUL, MINN.

COMPETITIVE DESIGNS FOR MEDALS TO BE AWARDED AT THE CINCINNATI ARCHITECTURAL EXHIBITION.

HOUSE FOR MRS. R. H. RICHARDS, ATLANTA, GA. MR. G. L. NORRMAN, ARCHITECT, ATLANTA, GA.

BUSINESS AND OFFICE BUILDING FOR FRANK RAUB, ESQ., NEW YORK, N. Y. MESSRS. DE LEMOS & CORDES, ARCHITECTS, NEW YORK, N. Y.

SAFE BUILDING.[1]—XXXVI.

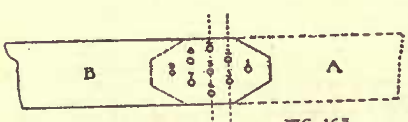


FIG. 165.

WHERE plates are lapped or joined by cover-plates, the rivets have to transfer the full strain from one plate to the other (in case of a lap); or from one plate to the cover-plate and from that to the other plate (in case of cover-plates). Of course, it can be readily seen that this means a large number of rivet-holes and a very great weakening of the plates. If it were practical to suddenly enlarge the plate at the riveting point there would be no loss, but this would be clumsy and besides it would not be practicable to roll plates with certain points enlarged or thickened. As the whole plate, however, will be equal only to its strength at its least cross-section the rivets should be so disposed as to weaken the plate as little as possible. This is done by pointing the plate ends in the case of lapping, or the ends of cover-plates where these are used, and are not covered in the construction. Where the plates are to be ultimately hidden out of sight, this expense is saved, the plate ends are left square, but the rivets are placed pointedly or pyramidically.

Plates weakened by holes.

Thus, in Figure 165 is shown a lapped joint with staggered rivets; we will suppose that calculation has shown the necessity of nine rivets to equal the tensional strain on each plate. The under plate A is dotted, the upper plate B drawn with full lines. By arranging the rivets as shown in Figure 165, each plate is weakened only by one rivet-hole. (As already explained the plates themselves need not necessarily be pointed, but can be left square, if expense must be considered and looks are no object.) For, while a section at C shows plate A weakened by two rivet-holes (Nos. 2 and 3) it must be remembered that the strain on A is no longer the full strain, but has been diminished by an amount equal to the work that would have come on the one rivet-hole; for rivet No. 1 has already transferred this amount to plate B. Similarly while a cut at D shows three rivet-holes (Nos. 4, 5 and 6) the plate is really not weakened at all here, for an amount of strain equal to what would have come on the metal taken from these rivet-holes has already been transferred to plate B by rivets Nos. 1, 2 and 3.

Lapped Joints.

Similarly as the strain on B increases the rivet-holes in it diminish till at No. 9, plate B has got the full strain and is therefore only weakened by this one rivet-hole.

The disadvantage of lapping plate ends is obvious, as the plate would not continue in the same plane. For this reason joints are generally made by butting the ends of the plates and covering one or both sides with cover-plates. The principle of riveting is the same as for lapped joints, but it will require a different disposition of the rivets, and twice the number of rivets, as plate A (Figure 166) has to transfer its strain to the cover-plate by one series of nine rivets, and the cover-plate transfers it to plate B by another series of nine rivets. This can be readily seen in Figure 166. In this case the disposition of the rivets requires an extra rivet each side, or 20 in all.

Butt joint with cover-plates.

Where it is not necessary to keep plates A and B in the same plane it would be cheaper and better of course to lap them, rather than to use *one* cover-plate. If, however, two cover-plates can be used, one on top of the plates and the other under them, the advantage is very great, as the strain will be transmitted in a direct line or plane from plate A to plate B, and besides this the joint is greatly strengthened by the friction between the cover-plates and plates A and B. In an experiment made by Clark with three $\frac{5}{8}$ inch thick plates riveted with one $\frac{7}{8}$ inch rivet through an oblong hole, it was found that friction added about 5 tons resistance against pulling out the centre plate. This would seem to add a safe-strength to each $\frac{7}{8}$ inch rivet of $\frac{5}{f}$ and if $f = 5$ (or a factor-of-safety of 5 were used) it would add just one ton to the calculated strength of a $\frac{7}{8}$ inch rivet. This increase, however, is a doubtful one, and would probably be lost in time by a gradual wearing of the plates due to this very friction, or possibly from slight rusting or other causes; no allowance should therefore be made for extra strength due to friction, but it certainly is a great advantage in making joints; and the above facts may account largely for the discrepancies in experiments on riveted joints, where no allowance is made for friction.

Two cover-plates best.

Gain by Friction.

The pitch of rivets is, of course, governed by circumstances. The rule is to try to arrange the rivets, so that the strength of the plate between them shall equal the actual strength of the rivet.

In boiler-work, however, they must be located not only for strength, but must be placed close enough to make the joint steam-tight. For this reason, too, boiler-plates are always lapped, the joint being more easily caulked and made tight.

Boiler Riveting.

In constructional work, however, there will be a great loss and waste of material, if the rivets are placed too closely. In plate girders and riveted joints in trusses the rule is not to make the pitch

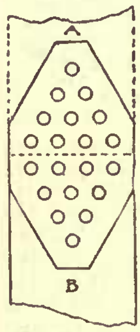
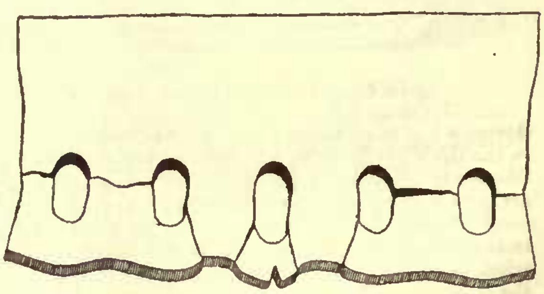


FIG. 166.


FIG. 167.

less than $2\frac{1}{2}$ diameters for punched-work, nor more than sixteen times the thickness of the least plate at the joint, or:

$$p = 16 . t \qquad (107)$$

Where p = the greatest pitch, in inches, for rivets of plate-girders or riveted trusses.

Greatest Pitch.

Where t = the thickness of the thinnest plate, in inches.

The pitch is measured from centre of hole to centre of hole on a direct (straight) line.

$$p_1 = 2\tfrac{1}{2} . d \qquad (108)$$

Where p_1 = the least pitch, in inches, for rivets of plate-girders or riveted trusses.

Least Pitch.

Where d = the diameter of rivet-holes, in inches.

The exact pitch must be between these two limits; and is, of course, calculated.

Different writers have attempted to lay down exact rules for the size of rivets to be used, using for a basis for the formulæ the thickness of thinnest plate to be riveted. Such rules, however, generally do not agree with good practice, as they either make the rivets too small for thin plates, or too large for thick ones, or *vice versa*.

Diameter of rivets.

[1] Continued from No. 721, page 180.

As a rule the local circumstances must control the selection of the size of rivet; the following, however, may serve as a general guide:
For plates from $\frac{1}{4}''$ to $\frac{7}{16}''$ thick, use rivet-holes $\frac{5}{8}''$ diameter.
For plates from $\frac{1}{2}''$ to $\frac{5}{8}''$ thick, use rivet-holes $\frac{3}{4}''$ diameter.
For plates from $\frac{11}{16}''$ to $\frac{13}{16}''$ thick, use rivet-holes $\frac{7}{8}''$ diameter.
For plates from $\frac{7}{8}''$ to $1''$ thick, use rivet-holes $1''$ diameter.

Of course, larger or smaller rivets can be used, but as a rule $\frac{5}{8}$ inch, $\frac{3}{4}$ inch, and $\frac{7}{8}$ inch are most desirable.

Figure 167 shows the different ways in which riveted-work will yield. This figure is made from a photograph of an actual specimen, tested and torn apart at the Watertown arsenal.

How plate yields. It is evident that the plate began yielding by all of the rivets compressing or crushing the plates, and finally yielded completely by tearing apart from 2 to 1 and to left edge and the same from 4 to 5 and the right edge, while rivet 3 tore its way completely out, shearing off a piece of the plate, and rivets 2 and 4 partially so.

The iron plates tested were 15 inches wide, $\frac{1}{2}$ inch thick, with two iron cover-plates 15 inches x $\frac{5}{16}$ inch each. The rivets were $\frac{15}{16}$ inch of iron and filled 1 inch drilled holes, pitch 3 inches.

The gross area of plate was 3,765 square inches, the net area 2,510. The total bearing-surfaces of rivets on the plates aggregated 1,255 square inches, and their aggregate shearing areas, (being in double shear) was 7,854 square inches. At 116715 pounds strain the edges contracted and scale on the specimen began to start and the plate yielded as shown at 167200 pounds strain. This was equal to 44410 pounds tension per square inch on the uncut plate, or 66610 pounds per square inch on a line at the rivet-holes (or net area).

The compression from the rivets was 133230 pounds per square inch, while the shearing was only 21290 pounds per square inch.

This example shows clearly how the plate yields. Besides this the joint might yield by breaking or shearing off the rivets. We have then the following six manners in which a riveted-joint might yield.

How Riveted joint yields. 1. By crushing either the rivet or the rivet crushing the plate.
2. By shearing off the rivet — in single shear.
3. By shearing off the rivet — in double shear.
4. By bending or cross-breaking of the rivet.
5. By tearing the plate apart or crushing it between rivet-holes.
6. By the rivets shearing out the part of the plate between them and the edge.

In Figures 168, 169 and 170 are shown three kinds of joints, each with a single rivet transferring the whole strain; in Figure 168 directly from plate *A* to plate *B*; in Figure 169 transferring strain from plate *A* to cover-plate and thence to plate *B*; and in Figure 170 transferring one-half of the strain *A* to *each* cover-plate and thence each half is transferred back again to plate *B*.

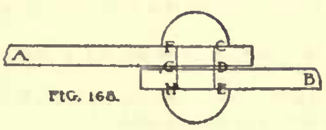


FIG. 168.

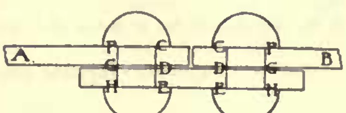


FIG. 169.

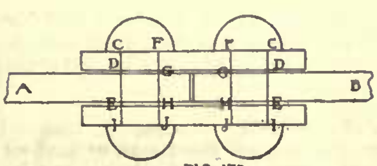


FIG. 170.

It should be remarked here that cover-plates (as in Figure 169) should be at least the full width and thickness of the original plates. In practice they are made a trifle thicker (about $\frac{1}{16}$ inch or more).

Cover-plates, as in Figure 170, should *each* be the full width of original plates and at least one-half the thickness of same; in practice they too are each made about $\frac{1}{16}$ inch (or more) thicker.

The plates *A* and *B* are themselves, of course, of the same thickness.

Failure by Compression. Now to prevent failure by the first method, compression, there must be area enough at both *G H* and *C D*, not to crush the rivet or the plates at these points, (*C D* + *E I* and at *G H* in Figure 170). This area is considered equal to the thickness of either plate *A* or *B* (or of cover-plate or their sums) multiplied by the diameter of rivet-hole.

Failure by Shearing. To resist failure by the second method, single-shearing of rivet, the area of cross-section of each rivet must be sufficient not to shear off under the total strain on either plate *A* or *B*. It will be readily seen that only the rivets in Figures 168 and 169 are subjected to single shearing, *viz:* at their sections *G D*. The rivets in Figure 170 have two areas resisting shearing, *G D* and *H E*, hence are subjected to double shearing; therefore their area of cross-section need only be sufficient to resist a shearing strain equal to only one-half of the *total* strain on either plate *A* or *B*, in order to avoid failure by the third method.

Failure by bending. To avoid failure by the fourth method, the rivet must be sufficiently strong to resist the load as a lever in Figures 168 and 169, and as a beam in Figure 170.

In Figures 168 and 169 we can consider the part *D C F G* as the built-in part of a lever, with a free end *D E H G* which carries a uniform load equal to the whole strain on either plate *A* or *B*.

In Figure 170 we have a beam supported at *C D G F* and *E I J H*, with its span or central part *G H E D* loaded with a uniform load equal to the whole strain on either plate *A* or *B*.

Failure of plate. To prevent failure by the fifth method the area of cross-section of either plate taken at right angles across same through the rivet-hole — (that is, deducting the rivet-hole from the area of cross-section) — should be sufficient to resist the tension or compression.

Failure by rivets tearing out. To prevent failure by the sixth method the rivets must be far enough from the edges of plates (cover and original plates) not to shear out the metal ahead of them. The rule is shown in Figure 171. Make angle $A\ O\ C = 90°$ that is a right angle (0 being the centre of rivet-hole and *C A* part of its circumference), and so that the directions of *O A* and *O C* are at 45° with edge of plate *D B*. Then the sums of the areas *A B* + *C D* — (that is, *A B* + *C D* multiplied by thickness of plate) — must be sufficient to resist the longitudinal shearing strain, which in this case would be the strain on either plate *A* or *B* (Figures 168 to 170).

To put the above in formulæ we should have:

Bearing.
$$x = \frac{s}{d.\,h.\left(\frac{c}{f}\right)} \qquad (109)$$

Use x for lap joints only.
Use $2\,x$ in place of x for butt joints with single or double cover-plates.

Single Shearing.
$$x = \frac{s}{0{,}7857.\,d^2.\left(\frac{g}{f}\right)} \qquad (110)$$

Use x for lap joints only.
Use $2\,x$ in place of x for butt joints with single cover-plate.

Double Shearing.
$$x = \frac{s}{1{,}5714.\,d^2.\left(\frac{g}{f}\right)} \qquad (111)$$

Use $2\,x$ for butt joints with double cover-plates.

Bending-moment Lever.
$$x = \frac{s.\,h.}{0{,}1964.\,d^3.\left(\frac{k}{f}\right)} \qquad (112)$$

Use x for lap joints only.
Use $2\,x$ for butt joints with single cover-plates.

Bending-moment Beam.
$$x = \frac{s.\,h}{0{,}7857.\,d^3.\left(\frac{k}{f}\right)} \qquad (113)^1$$

Use $2\,x$ for butt joints with double cover-plates.

Tension on Plate.
$$h = \frac{s}{b.\left(\frac{t}{f}\right)} \qquad (114)$$

Use $\left(\frac{c}{f}\right)$ instead of $\left(\frac{t}{f}\right)$ if plate is in compression.

Shearing end of plate.
$$y = \frac{s}{2.\,h.\left(\frac{g}{f}\right)} \qquad (115)$$

(If more than one rivet use $\frac{s}{x}$ instead of s for distance of each rivet from end as shown in Figure 171.)

Where s = the whole load or strain, in pounds, to be transferred from one side of the joint to the other.

Where d = the diameter of rivet-hole, in inches.

Where h = the thickness of plate, in inches. Where more than one plate is used, take for h the *least* aggregate sum of thickness of all plates acting in one direction. (The sum of cover-plates should at least equal this aggregate in thickness and should be larger, where the net b of cover-plates is smaller than the net b of connected plates.)

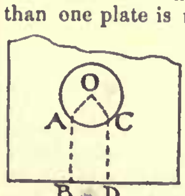


FIG. 171.

Where b = the net breadth of plate, in inches, that is the breadth, less rivet-holes, at the weakest section; where more than one plate is used they should all of course be of same breadth. The net b of cover-plates will frequently be much less than that of original plates, as they lose the greatest number of rivet-holes at their centre, where they are carrying the full strain.

Where x = the total number of rivets required at the joint for lap joints, and the number required *each side of joint* for butt joints with single or double cover-plates; that is in the latter two cases $2\,x$ will be the total number of rivets required.

Where y = in inches, is the length *A B* or *C D* (Figure 171) from *any* rivet to free edge of plate; where more than one rivet is used, insert $\frac{s}{x}$ in formula, in place of s. It will only be necessary, of course, to calculate y for the line of rivets nearest free edge.

Where $\left(\frac{c}{f}\right)$ = safe compression stress, per square inch,

Where $\left(\frac{t}{f}\right)$ = safe tension stress, per square inch,

[1] The fourth decimal given in formulæ is not quite right, but is made to correspond with fractions used in Table I.

Where $\left(\frac{g}{f}\right)$ = safe shearing stress, per square inch,

Where $\left(\frac{k}{f}\right)$ = safe modulus of rupture, per square inch,

all in pounds, (see Table IV).

Safe stresses on rivets and pins. The writer uses the following values, as a rule for *rivets and pins.*

For Wrought-Iron. $\left(\frac{c}{f}\right) = 12000$ pounds, per square inch.

$\left(\frac{t}{f}\right) = 12000$ pounds, per square inch.

$\left(\frac{g}{f}\right) = 8000$ pounds, per square inch.

$\left(\frac{k}{f}\right) = 15000$ pounds, per square inch.

For Steel. $\left(\frac{c}{f}\right) = 15000$ pounds, per square inch.

$\left(\frac{t}{f}\right) = 15000$ pounds, per square inch.

$\left(\frac{g}{f}\right) = 10000$ pounds, per square inch.

$\left(\frac{k}{f}\right) = 18000$ pounds, per square inch.

Example I.

Lap Joint. *A wrought-iron plate, which cannot be over* 12″ *wide, is so long that it has to be made in two lengths; the joint is to be a lap joint. The plate is in tension and is strained* 65000 *pounds. Design the joint.*

We will assume that we propose to design the joint as shown in Figure 165, with staggered rivets, in that case the plate will only be weakened by one rivet-hole. We can readily see that the plate will not need to be very thick and decide to use $\frac{3}{4}''$ rivets, (that is $\frac{3}{4}''$ rivet-holes); we then shall have a net breadth of plate

Size of plate. $b = 12'' - \frac{3}{4}'' = 11\frac{1}{4}''$.

Of course $s = 65000$ in this case, and we know that

$$\left(\frac{t}{f}\right) = 12000;$$

inserting these values in Formula (114) we have:

$$h = \frac{65000}{11\frac{1}{4}.\ 12000} = 0{,}485''$$

Or we should use a plate one-half inch thick.

We next determine the number of rivets required.

Required number of rivets. In the first place there must be enough for bearing, that is not to crush the plate or get crushed by it. We use Formula (109) inserting the values, and have:

$$x = \frac{65000}{\frac{3}{4}.\ \frac{1}{2}.\ 12000} = 14{,}44$$

Or we should need 15 rivets for bearing. Had we figured without using the formula, we should have said, the bearing area of each rivet is $\frac{3}{4}''$ by $\frac{1}{2}'' = \frac{3}{8}$ square inches, this at 12000 pounds, per square inch, would equal 4500 pounds safe-compression for each rivet, dividing this into 65000 pounds, the strain, would, of course, give the same result 14,44 or say 15 rivets.

We next see if there is any danger from shearing. The joint being a lap joint, the rivets will have, of course, only one sectional area to resist shearing, that is, will be in single shear, so that we use Formula (110) and inserting values have:

$$x = \frac{65000}{0{,}7857.\ (\frac{3}{4})^2.\ \left(\frac{g}{f}\right)} = 18{,}39$$

Or we must use 19 rivets to prevent the shearing.

Had we figured without the use of formula, we should have said, area of a $\frac{3}{4}''$ rivet is $= 0{,}4417$ square inches. This multiplied by 8000 pounds (the safe shearing stress per square inch) $= 3533{,}6$ pounds, or each rivet could safely assume this amount of the strain without shearing. This amount being *less* than the safe compression on each rivet, would, of course, require a larger number of rivets, and should therefore be used, rather than the latter. We have, in effect $\frac{65000}{3533{,}6} = 18{,}39$ or say 19 rivets, being four more than required for bearing.

We next take up the question of bending; the joint being lapped the rivets will practically become short levers. We use Formula (112); inserting values, we have:

$$x = \frac{65000.\frac{1}{2}}{0{,}1964.\ (\frac{3}{4})^3.\ 15000} = 26{,}15$$

Or we should have to use at least 26 rivets to prevent bending; which readily illustrates the great disadvantage of not transferring the strain in a direct plane, by using two cover-plates.

Had we not used the formula, we should have said, we have here a $\frac{3}{4}''$ circular lever, the free end projecting $\frac{1}{2}''$ and loaded uniformly with a load of 65000 pounds.

From Formula (25) or Table VII we have the bending-moment

$$m = \frac{65000.\frac{1}{2}}{2} = 16250 \text{ pounds-inch.}$$

and from Table I, section No 7 the moment of resistance,

$$r = \frac{1}{10}.\ (\frac{3}{4})^3 = 0{,}04143$$

From the formula on page 49, Volume I,

$$\frac{m}{r} = s$$

we have the total extreme fibre strains on all the rivets,

$$s = \frac{16250}{0{,}04143} = 392228 \text{ pounds.}$$

This divided by the safe strain, or safe modulus of rupture $\left(\frac{k}{f}\right) = 15000$ pounds, will give the number of rivets required, *viz:*

$$\frac{392228}{15000} = 26{,}15$$

or 26 rivets as before.

We still have to decide the distance y (or $A\ B$, Figure 171). We use Formula (115). As there are more than one rivet we use in place of s the strain on each rivet or $\frac{s}{26}$, which was the largest number required as above, therefore:

$$\frac{s}{26} = \frac{65000}{26} = 2500$$

Inserting this in Formula (115) we have:

$$y = \frac{2500}{2.\ \frac{1}{2}.\ 8000} = 0{,}3125''$$

This, however, being less than our rule which requires $1\frac{1}{2}$ diameters from centre of hole to edge, we will stick to the rule.

We now design the joint.

We have a plate 12″ wide, $\frac{1}{2}''$ thick, lapping, and require 26 rivets.

Designing the joint. They must be arranged not to weaken the plate by more than one rivet-hole.

If we arrange the rivet-holes as shown in Figure 172, we will find it the most economical arrangement.

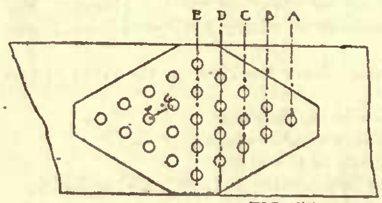


FIG. 172.

To be sure it allows for only 25 rivets, but that will probably be near enough, otherwise we should have to insert at least five more to keep them symmetrical. It will be readily seen that the weakest point is at section A where one rivet-hole is lost. Section B is of same strength, two rivet-holes being lost, but the strain has been reduced by an amount equal to the value of one rivet-hole.

At section C we lose three rivet-holes, but the strain has been reduced by the value of three rivet-holes, so that the plate practically has its full value here.

At sections D and E the plate is stronger to resist the remaining tension than required.

By figuring out E (12″ wide) it will be seen that the pitch on this line is more than required by the rule, Formula (108).

The pitch $F\ G$ between two adjacent lines of rivets, measured on the slant from centre to centre of rivets, should be at least $2\frac{1}{2}$ diameters, $2\frac{1}{2}.\ \frac{3}{4} = 1\frac{7}{8}''$ or say 2″.

It will be good practice for the student to carefully lay this joint out to scale.

Example II.

Butt joint single cover-plate. *A steel plate* 10″ *wide has to be pieced, and for local reasons this can only be done by a cover-plate on one side. The plate is subjected to a tensional strain of* 135000 *pounds. Design the joint.*

Of course, the rivets must be of steel too.

We will again assume that we can stagger the rivets, so that we shall lose only one rivet-hole. The plate will evidently have to be thick and we will decide to use 1″ rivets; this would leave us a net breadth of plate

Size of plate. $b = 10'' - 1'' = 9''$

From Formula (114) we have:

$$h = \frac{135000}{9.\ 15000} = 1''$$

Or the plate will have to be just one inch thick. The cover-plate should be at least the same, if there were only one rivet, but as there will evidently be more than one and we propose staggering the rivets, the cover-plate will have to be considerably thicker; we can therefore leave the cover-plate out of consideration for the present as, being thicker, or in case of one rivet equal to the plates to be joined, it will certainly be as strong, and not crush.

Required number of rivets. Now, as for the number of rivets, from Formula (109) we have for bearing:

$$x = \frac{135000}{1.\ 1.\ 15000} = 9$$

Or nine rivets are required not to crush the plate or be crushed by it (each side of joint).

From Formula (110) we have for single shearing (as there is evidently only one area to each rivet to resist shearing):

$$x = \frac{135000}{0{,}7857.\ 1^2.\ 10000} = 17{,}2$$

Or seventeen rivets are required to resist the shearing (each side of joint). The rivets will evidently be levers in this case and we have from Formula (112)

$$x = \frac{135000 . 1}{0,1964 . 1^3 . 18000} = 38,1$$

Or it will require thirty-eight rivets to resist the bending-moment (each side of joint). This again shows the advantage of using both a top and bottom cover-plate and so avoiding the great leverage on the rivets.

Designing the Joint. It must now be borne in mind that the joint is a butt joint, therefore, unlike the case of lap joint where the whole number of rivets bear on each plate, we must here use twice the number, as only one-half, or those each side of the joint bear on one plate, or we require in all 76 rivets.

The plate is so narrow that we cannot get more than three rivets on a line across the plate, without infringing on the rules for pitch. We can, therefore, stagger the end rivets and make the rest either

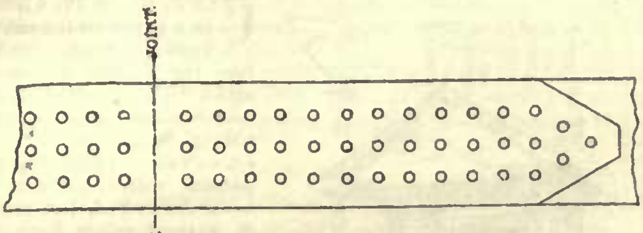


FIG. 173.

chain riveted or zig-zag riveted. The chain riveting will require a little longer cover-plate, but in the case of a plate-girder flange would have the advantage of using the rivets that are needed for the angle-irons.

In that case we should not stagger the end rivets, for our plate would only be weakened by one additional hole, and, of course, the gross breadth of plate would have to be 12 inches instead of 10 inches to give same strength.

Figure 173 shows this joint chain riveted, with end rivets, staggered, to correspond to our calculated example.

We see that it takes 39 rivets each side of joint for symmetry.

Figure 174 shows this joint zig-zag riveted. It has three advantages over the other, it is shorter, takes just the right number of

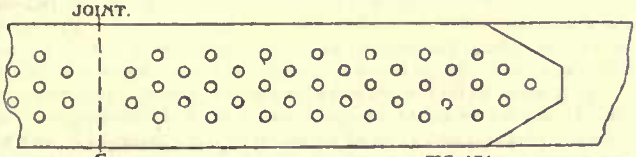


FIG. 174.

rivets and requires a thinner cover-plate. For in Figure 173 at the first line of rivets (C) next to the joint, the cover-plate loses three rivet-holes and bears the full strain, or its clear breadth would be only 7 inches and from Formula (114) would require a cover-plate of thickness

$$h = \frac{135000}{7.15000} = 1,3$$

or say $1\frac{5}{16}''$ thick.

Whereas, in Figure 174, at the line C we lose only two rivets and have consequently a clear breadth of 8 inches and require from Formula (114) a cover-plate of thickness equal to

$$h = \frac{135000}{8.15000} = 1,125$$

or only $1\frac{1}{8}$ inch cover-plate.

Had we not used the formula we should have figured out our rivets, etc, as follows:

Required net or clear area of plate

$\frac{135000}{15000} = 9$ square inches. Net breadth being 9″ gives, of course, 1″ thickness.

Bearing area of each rivet $= 1.1 = 1$ square inch, which will safely bear 15000 pounds or we should need

$\frac{135000}{15000} = 9$ rivets.

Single shearing area of each rivet (or area of a circle 1″ diameter) $= 0,7854$ square inches, which at 10000 pounds per square inch, would give a resistance to shearing per rivet $= 7854$ pounds or we should need

$\frac{135000}{7854} = 17,2$ rivets. For bending we should have a one inch circular lever, projecting one inch and uniformly loaded with 135000 pounds.

The bending-moment would be Formula (25)

$$m = \frac{135000 . 1}{2} = 67500 \text{ pounds.}$$

The moment or resistance would be Table I, section No. 7

$$r = \frac{1}{12} . (\tfrac{1}{2})^3 = 0,0982$$

The strain s, therefore, on all the rivets will be [page 49, Volume 1]

$$s = \frac{67500}{0,0982} = 687373$$

This divided by the safe modulus of rupture for steel rivets $\left(\frac{k}{f}\right) = 18000$ will give the required number, as before,

$\frac{687373}{18000} = 38,2$

LOUIS DECOPPET BERG.

[To be continued.]

THE CHANNEL BRIDGE.



The Gewandhaus. Brunswick Ger.

THE author of a paper, which was read at the recent meeting of the Iron and Steel Institute, is M. Henri Schneider. Its title is "The Channel Bridge, Preliminary Designs by Messrs. Schneider and Co. (Creusôt Iron Works), and H. Hersent," whilst at the bottom of the title-page it is added that Sir John Fowler and Mr. Benjamin Baker, chief engineers to the Forth Bridge, are consulting engineers. When we add that the President, Sir James Kitson, stated, during the discussion, that an eminent firm of financiers — who could, as he said, finance any scheme they had a mind to — had undertaken to find the money, it would seem as if the Channel Bridge — as a project at any rate — had come amongst us, and come to stay. We shall content ourselves with a brief abstract giving the chief elements of design in this Cyclopean dream of giant minds.

The amount of metal and machinery to be provided for the construction of a bridge over the Channel would represent an aggregate weight of about 1,000,000 tons; and it is assumed that each country, England and France, would supply about one-half of the quantity — a statement at once calculated to enlist the sympathies of a meeting of the Iron and Steel Institute. To pay for masonry supports the sum of 380,000,000 francs would be required, whilst the metallic superstructure would absorb 480,000,000 francs. The total would be 860,000,000 francs, or, say 34,000,000 pounds sterling.

For site the shallow part of the Channel stretching between Folkestone and Cape Grisnez has been selected. Here the shoals of the Colbart and Varne help the engineer. The deepest water in which foundations would have to be sunk would be 55 metres, or, say 30 fathoms. The total length bridged would be 38,600 metres, or $24\frac{1}{2}$ miles.

The result of experiment shows that the bottom is not unfavorable, the ground being sufficiently solid to support very extensive works. The white and blue chalk, which everywhere forms the Channel bottom, will carry 10 to 12 kilogrammes per square centimetre, or, say 10 tons per square foot. Soft parts of the surface and sediment will have to be removed at certain points. Each supporting pier will be a solid masonry rectangle 25 metres (82 feet) in length and of width to suit the columns. It will be brought above high-water level. Above will rise metal columns. The surface in contact with the ground may be 1604 square metres (17,265 square feet) or less according to depth. The masonry will be built inside metal caissons forced by compressed air down to the solid ground. The caissons will be surmounted by metal cases surrounding the masonry and will serve to float the piers until they touch the ground. The distance between the piers is fixed at 500 and 300 metres (984 feet and 1640 feet) for the large spans and will not be less than 200 and 100 metres (656 feet and 328 feet) respectively for the small spans. This, it is said, will prevent them proving an obstacle to free navigation of even sailing vessels.

The metallic columns are to be, as is all the metal-work, of steel, the height varying between 40 and 42.78 metres (131 feet and 140 feet). On these will be placed the main girders of the bridge. The head-room, or rather mast-room, will be at high-water springs 54 metres, or 177 feet. From the form of construction this height will continue throughout the spans. This height, we may state, is about 26 feet more than that of the Forth Bridge. Simple, unlatticed, trussed girders have been adopted in the design. The permanent way is 72 metres (236 feet) above the low-water level. There will be double sets of rails and the width of the flooring proper will be 8 metres (26 feet 3 inches). The whole width of the bridge is variable, the greatest distance between the main girders is 25 metres (82 feet 3 inches), such a space being necessary the insure the stability of the structure against violent wind.

The most difficult operation is estimated to be the placing of piers, and the special precautions to be observed are detailed in the paper. The method to be adopted of floating out the piers is very ingenious, and there appears to be no doubt in the minds of those concerned that they will be successful, although the undertaking is of so bold and novel a character. It is pointed out that at Toulon masses of brickwork representing a weight of 100,000 tons have been kept afloat in the caissons for several months.

A port will be constructed on either coast, especially arranged to facilitate the work. If a pier, when taken to its site and sunk, were found to be not in its proper position, it would be necessary to float it again by compressed air. The position of a column in the centre of anchored barges attached by moorings is compared to that of a spider in the middle of its web. Oil is to be employed to smooth the water if necessary. It is proposed to complete the whole work within a period of ten years from starting.

In considering the spans of 300 and 500 metres, the first idea is to form the spans of girders extending over the whole length of 300 metres and extending on either side in the form of cantilevers of 250 metres, so that the junction of the two cantilevers should constitute a span of 500 metres in all. It is found, however, that the addition of a central independent span is advisible; a saving of about 17 per cent of weight is thus realized in each overhanging portion of the cantilever. The flooring of the bridge is formed of two girders resting on two piers. Each girder consists of two members, or chords, connected by bracings forming isosceles triangles. The lower flanges of the two girders have a distance of 25 metres between their axes in the central span of 300 metres and an interval of 10 metres at the ends. They are horizontal in the central span, but are raised to a height of 5 metres at the ends of the cantilevers. For erecting the cantilever arms auxiliary and removable piers are to be used; for the larger spans two of these auxiliary piers will be required. Very elaborate details of weights, calculations of resistance, stability of piers, etc., are given, but for these we must refer our readers to the paper itself.

Before the discussion was commenced the President requested speakers to confine themselves to those constructive details on engineering questions which might fairly come within the scope of the meeting of the Iron and Steel Institute, and not wander off into political questions and those relating to navigation, a request which was not much regarded by some of those who took part in the discussion.

The first speaker was Mr. Daniel Adamson, who said he would have been glad to confine himself to the lines laid down by the President, but it was impossible to forget that there was a national and commercial side to the proposals put forward, as well as an engineering aspect. He questioned whether the French people were not being asked to give twenty-five shillings for a British sovereign. It was impossible to consider this scheme without looking to the alternative proposals of a tunnel, neither could it be ignored that all nations have a right to the free navigation of the Channel between England and France. A feature that would modify the commercial or financial aspect of the scheme would be the advance that might fairly expected to be made in steamship economy during the ten years of the bridge's construction. During the last ten years fuel consumption in steamers had been reduced in a very considerable manner, and if the next ten years showed a like progress, sea carriage would be still further cheapened. Even now an ocean steamer would carry cargo at one-fifth of a penny per ton per mile as compared to the 1*d.* to 2½*d.* of railway carriage. It may, however, be pointed out here, as the supporters of the scheme would doubtless have done had they been present, that in across-Channel freightage it is not the actual carriage per ton-mile, but the transhipment of goods. To make the comparison just, Mr. Adamson should have taken the cost of unloading goods from railway trucks to steamer on one side, and from steamer to train again on the other, and have added this to the ton-mile of carriage for the 20 or 30 miles of Channel passage.

Comparing the designs before the meeting with those of the Forth Bridge, Mr. Adamson rejoiced that there was not a prospect of the latter being adopted. He also referred to the great cost of painting the bridge. He said it would be liable to total disablement from one piece being knocked out by collision from a passing steamer, apparently being much in the same frame of mind as the member of Parliament who asked George Stephenson the immortal question about the cow. In conclusion he thought the scheme wanted serious consideration, but he rejoiced that something should be done tending to free commercial intercourse, make nations more neighborly, and make the world wiser and better.

Mr. Tilden Wright said he appeared as an advocate of the Channel Tunnel. For the last six or seven years he, with others, had worked for the Channel Tunnel, and he was glad some other party had come at last to help them in their struggle against prejudice. But though he was in favor of connecting England and France by some physical tie, he considered that the bottom of the sea was a more suitable medium than an aërial connection, and the estimated cost of the tunnel was but one-sixth the estimated cost of the bridge.

In summing up the discussion, the President said—in reference to some remarks which fell from Mr. Adamson respecting the scheme being the outcome of "youthful and enthusiastic minds with courage only equalled by their audacity"—that the names which backed the scheme had been apparently overlooked by Mr. Adamson. He thought Sir John Fowler, at any rate, might be supposed to have sown his professional wild oats. He had just finished the Forth Bridge, and had told him (Sir James) personally that he would guarantee the Channel Bridge. If so great an engineer as Sir John said such a thing as this, there only remained one formality, to find the money. A great financier in Paris—one who could do almost anything in the way of money—had told him (Sir James) that he would find the money—a fact which he, as a maker of iron and steel, was delighted to hear, as he hoped that he, in common with many other members of the Institution, would find a good deal of his material incorporated in the Channel Bridge.—*Engineering.*

PHOTOGRAPHING COLORS.



CAPT. W. DE W. ABNEY, in a paper on the effect of light on matter read before the British Association, said: "The question is often asked when photography in natural colors will be discovered. Photography in natural colors not only has been discovered, but pictures in natural colors have been produced. I am not alluding to the pictures produced by manual work, and which have from time to time been foisted on a credulous public as being produced by the action of light itself, much to the damage of photography and usually to the so-called inventors. Roughly speaking, the method of producing the spectrum in its natural colors is to chlorinize a silver plate, expose it to white light till it assumes a violet color, heat till it becomes rather ruddy, and expose it to a bright spectrum. The spectrum colors are then impressed in their natural tints. Experiment has shown that these colors are due to an oxidized product being formed at the red end of the spectrum and a reduced product at the violet end. Photography in natural colors, however, is only interesting from a scientific point-of-view, and, so far as I can see, can never have a commercial value.

"A process to be useful, must be one by which reproductions are strictly made; in other words, it must be a developing and not a printing process, and it must be taken in the camera, for any printing process requires not only a bright light, but also a prolonged exposure. Now, it can be conceived that in a substance which absorbs all the visible spectrum, the molecules can be so shaken and sifted by the different rays that eventually they sort themselves into masses which reflect the particular rays by which they are shaken; but it is almost—I might say quite—impossible to believe that when this sifting has only been commenced, as it would be in the short exposure to which a camera picture is submitted, the substance deposited to build up the image by purely chemical means would be so obliging as to deposit in that the particular size of particle which should give to the image the color of the nucleus on which it was depositing. I am aware that in the early days of photography we heard a good deal about curious results that had been obtained in negatives, where red-brick houses were shown as red and the blue sky as bluish. The cause of these few coincidences is not hard to explain, and would be exactly the same as when the red-brick houses were shown as bluish and the sky as red in a negative. The records of the production of the latter negatives are naturally not abundant, since they would not attract much attention. I may repeat then that photography in natural colors by a printing-out process—by which I mean by the action of light alone—is not only possible, but has been done, but that the production of a negative in natural colors from which prints in natural colors might be produced appears, in the present state of our knowledge, to be impossible. Supposing it were not impracticable, it would be unsatisfactory, as the light with which the picture was impressed would be very different from that in which it would be viewed.

"Artists are fully aware of this difficulty in painting, and take their precautions against it. The nearest approach to success in producing colored pictures by light alone is the method of taking three negatives of the same subject through different colored glasses, complementary to the three color sensations which together give to the eye the sensations of white light. The method is open to objection on account of the impure color of the glasses used. If a device could be adopted whereby only those three parts of the spectrum could be severally used which form the color sensations, the method would be more perfect than it is at present. Even then perfection could not be attained, owing to a defect which is inherent in photography and which cannot be eliminated. This defect is the imperfect representation of gradation of tone. For instance, if we have a strip graduated from what we call black to white (it must be recollected that no tone can scientifically be called black and none white) and photograph it, we shall find that in a print from the negative the darkness which is supposed to represent a gray of equal mixtures

of black and white, by no means does so, unless the black is not as black or the white as white as the original."

SOCIETIES

ST. LOUIS ARCHITECTURAL LEAGUE.

THE bi-monthly meeting of the League was held at their rooms, Saturday evening, October 12, with a good attendance. Designs were submitted for a City Front; the judges to report at the next regular meeting. Action was taken in regard to the annual meeting in November. It was decided to give an informal reception to a limited number of guests, the programme being as follows:

Business meeting, at 6 o'clock P. M.; Reception, at 8 o'clock P. M. There will be an address by the President; the announcement of the prizes of the annual competition; a lunch, and an exhibit of drawings, the work of the present year. After a general discussion of proposed work for the coming year the Club adjourned to meet October 26.

BOSTON ARCHITECTURAL CLUB.

THE Club is to give a reception, Thursday, October 24, to Mr. Edgar Josselyn, the fourth Rotch Travelling Scholar. Mr. Josselyn's scholarship work and sketches will be on public exhibition during the week at the Club rooms, No. 6 Hamilton Place.

The membership lists of the club are now nearly complete, there being only twelve vacancies. Any who are thinking of becoming members are requested to send their names at once to the Secretary.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE STRICTURES OF THE DAILY PRESS.

ROCHESTER, N. Y., October 14, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I enclose you a clipping from the editorial page of one of our leading newspapers, which gives a good idea of how public opinion is influenced against our profession by the press, which, in all other arts and sciences, generally sides with the right.

I presume the paragraph was inspired by the recent meeting of architects at Syracuse, in which convention the most important matter brought up for discussion was the proposed law placing restrictions upon the practice of architecture similar to those upon the legal and medical professions.

As I have been asked to send a short reply to the paper, explaining the true meaning and benefit of such a bill, I take the liberty of asking first for your valuable advice as to what you think would be the best thing to say in a few words in answer to such a misleading editorial, and what would most influence the public to believe that such a movement is something more than making a "corner in plans."

You see, if the public — I mean the great masses outside of our profession — could only read the *American Architect* every week, it would not be long before a decided improvement would be noticed in public opinion as to the proper conduct of our profession. But, unfortunately, your editorials are like the good sermons of the preachers and reformers, which fail to reach the majority of those for whom they are most intended, because those are the very people who never go to church or anywhere else where they can hear good advice.

When the daily press is against us, it is hard work indeed to try and raise the standard of our profession in the community in which we live. Yours, ARCHITECT.

"The architects have perfected a bill which is expected to keep the planning of buildings in the hands of the fraternity. The cornering business must end somewhere." — *Editorial from Democrat and Chronicle.*

[IT would never occur to us to think the squib anything but feebly amusing and quite harmless. We do not believe there was any serious motive in printing it any more than there could have been much thought wasted in writing it. In cases of such a "grievance" as this, it would be our advice, every time, to let it alone. — EDS. AMERICAN ARCHITECT.]

LAMB & RICH *vs.* BLOOR.

NEW YORK, N. Y., October 22, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In your number of October 19, 1889, you give an account of a legal controversy between me and Messrs. Lamb & Rich. As you seem to have been misinformed as to the real nature of the matter, both as to the law and facts, I enclose herewith a copy of the pleadings in the matter, which fully explains the nature of the controversy. A. J. BLOOR.

[WE have read carefully the pleadings which Mr. Bloor kindly sends, but do not find anything which shows that the controversy was not described with substantial accuracy in our editorial note. Obviously, as the pleadings contradict each other, they afford no certain evidence as to the facts; the verdict will be the best indication in regard to these, if the unfortunate affair should be pressed to a conclusion. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

WIND-PRESSURE AT THE EIFFEL TOWER. — From calculations made concerning the resistance which the Eiffel Tower can offer, it is ascertained that it is able to sustain a normal wind-pressure of 881 pounds to the square yard, or a total pressure of more than 6,000,000 pounds, so that if at any time a hurricane of such unheard-of force should come to exert its force against it, the tower would bravely stand its ground, while in all probability most of the surrounding establishments in Paris would be demolished. — *Boston Transcript.*

A MOSQUE UNEARTHED FROM THE SAHARA DESERT. — One of the engineers on the Sahara Railroad, now being constructed by France, reports a discovery of great archæological value. Coming upon a mound of sand he had it dug into and found a dome, which proved to be the top of a tower, and, digging deeper, the tower proved to belong to a mosque entirely embedded in the sand. Continuing his researches he has uncovered nine houses and a water-course. The water-course is of great value, and will be used for irrigation. This discovery confirms the impression that the Sahara is another instance of the modification which climatic changes will effect and that it was once a populous land instead of the waste of desert we see it to-day. — *Exchange.*

MELTING ZINC. — Zinc is troublesome to cast, and more troublesome when small, thin moulds are to be cast. Lining the mould with whiting and water, which must be allowed to thoroughly dry, will often cause the metal to fill the mould well. Burning of the zinc (oxidizing) may be prevented by covering the metal, while in a crucible or ladle, with a layer of common salt, or a little muriatic acid, which amounts to the same, as a coat of zinc oxide is immediately formed on the surface of the melted metal, which effectually prevents further oxidization from action of oxygen in the atmosphere. It is an improvement to keep a layer of charcoal on top of the zinc, or any other soft metal which can be melted in a ladle. The coating of oxide forms a protection against oxidization to only a certain degree, while the layer of charcoal tends to reduce the oxide again to its metallic form. Indeed, it is possible to recover lead, tin, zinc and antimony from the "dross" or oxide which gathers in the ladle. It is only necessary to melt the oxide with charcoal, salt and soda to get it again into useful shape. The dross should be powdered; likewise the salt, charcoal and soda. Mix them together and melt. The soda and salt melt into a pasty mass, and the carbon unites with the oxygen of the dross, leaving the metal free, but burning off the charcoal. The salt and soda simply act as flux in reducing the oxides. — *The Northwestern Mechanic.*

COOPER UNION'S GREAT SCHOOLS. — The free classes in Cooper Union have opened for the fall term. Sessions of the day classes began at nine o'clock in the morning, and the night classes met at 7:30. All the classes are full, and the Trustees of the Union look forward to as fruitful a term as the institution has ever had. The staff of instructors, save for one or two changes, is the same as last year. There has been an unusual rush of applications for admission, and there are several thousand eligible candidates who have been denied admission owing to lack of room. The classes in the Scientific and Art Schools are complete with the following number of pupils:

Elementary mechanics	60	Arch. drawing	200
Astronomy	260	Elem. arch. drawing	100
Applied mechanics	20	Descrip. geometry	50
Analytical geometry	45	Mech. drawing	200
Dif. and int. calculus	45	Elem. mech. drawing	50
Trigonometry	60	Drawing from copy	400
Geometry	180	Decorative designing	180
Algebra	180	Drawing from cast	100
Natural Philosophy	300	Drawing from form	100
Geology	250	Perspective	80
Elem. chemistry	300	Modelling in clay	120
Chemical analysis	25		

Another class that has begun its daily sessions, one of the most interesting in the Union, was the Women's Class in Phonography and Type-writing. Fifty pupils form the complement of this department, and they are under the guidance of Miss M. E. Robbins, whose success with last year's class was so marked as to particularly attract the attention of the Trustees. There were about three hundred applicants for admission to this class, and the Assistant Secretary, L. C. L. Jordan, informed an *Evening Post* reporter that it was with great care and greater difficulty that the members had been selected. The Free School in Telegraphy for Women has also opened. In this, too, the number of pupils is fifty, and their instructress is Miss Annie F. Brown. The Women's Art School began its term on Friday. The discipline of the various classes is strict. Repeated absence or tardiness is not countenanced except under exceptional circumstances. Any pupil absent on three occasions without sufficient excuse is immediately dropped from the roll. — *N. Y. Evening Post.*

The First European Gallery of Casts. — The old characteristic houses of Vienna are being pulled down one by one, and the traditions attaching to them are fading, and will be utterly forgotten by the generation which is at present growing out of its teens. These old houses were for the most part known by a name, streets with numbered houses having formerly been uncommon. The autumn is the season for pulling down what is condemned to fall, because the foundations can be prepared during the winter, and in the newborn spring five-storied monsters, that darken the streets and conceal the blue sky, spring up as if by magic. This autumn, as in previous years, demolition is the order of the day, and a few days ago the bricklayer's spade struck the foundation-stone of the old Muller Haus. This old house is rich in historical associations. The house, which consisted of long galleries and spacious parlors, was built a little less than 100 years ago, by Joseph, Count Deym of Striletz, who, although he was of undoubted nobility, and proprietor of a feudal castle, was still proud to bear the title of Court Statuary to Emperor Francis of Austria. The story of this title is worth telling. He entered the army at eighteen, and being of fiery temperament, was soon involved in a duel. Having seen his antagonist fall, and believing him to be dead, he fled from his native country and sought refuge in Holland, where he called himself Muller, and professed to be an artist. He earned his living by embossing small portraits in wax on light blue glass, and in a few years time, having earned fame and money, he migrated to Italy. In Naples he soon found favor with Queen Caroline, an Austrian Princess, to whom he told his story. She obtained for him the permission first to copy in wax the finest sculptures of the Naples Art Gallery, and then to take plaster casts from them — the first that were ever taken. He returned to Vienna with a fortune of 300,000 silver florins, honestly earned, and promised to show his fellow-countrymen what formerly only the few favored ones who could travel to Naples could hope to see. Nobody believed him; but in good time 100 busts and statues, copied from the masterpieces of ancient Greece and Rome, arrived, transported from Naples to Vienna at great cost, and with wonderful patience. The Emperor gave him some good ground upon which to build a house with galleries, and after having inspected the valuable property conferred upon him the title of Court Statuary. Count Deym never took his family name any more, but called himself Joseph Muller to the end. All Vienna thronged to his show, and Count Deym made his galleries especially attractive by a new invention. He was the first to use glass prisms on his chandeliers, and with the aid of thousands of wax candles, earned for his house the name of a fairy palace. He gradually completed his collection by adding original works of art in bronze, marble and ivory, and a by no means inconsiderable number of oil paintings. He married a lady of ancient nobility, a Countess Buguoy, who did not call herself Muller. She and her three sons and four daughters took the name of Deym. In the foundation-stone revealed to light were found beautiful sculptured and tinted apples, pears and peaches, a saucer of old Vienna porcelain in which lay diverse crystal prisms, Count Joseph Deym's portrait in wax on blue glass, a beautiful piece of work, and very well preserved, and a large leaden tablet engraved on both sides, giving the history of the founder of the house, the Imperial grant and a detailed account of the uses to which the building was to be put. Besides these things a glass goblet was found, but a workman dropped it as he took it out, and it was shattered to fragments. There can be no doubt that the Count's portrait was his own work, as well as the prisms in the foundation-stone. The fact of his placing them there shows how proud he was of his invention. — *London News.*

How Paul Veronese Paid for his Lodging. — Protogenes, the Greek painter, was an impatient man. In painting a picture of a tired, panting dog, he met with satisfactory success, except that he failed in every attempt to imitate the foam that should have been seen on the dog's mouth. He was so much provoked over it that he seized the sponge with which he cleansed his brushes and threw it against the picture with the intention of spoiling it. It happened to strike on the dog's mouth, and produced, to the astonishment and delight of the painter, the very effect that he had labored so persistently to imitate. Paul Veronese, like many other painters, was given to eccentric moods and odd habits. On one occasion he accepted the hospitality of a family at their beautiful country villa. He assumed great liberties during his visit, claiming absolute possession of his room, allowing not even a servant to enter. He would not suffer the maid to make his bed, and the sweepings of the room were left every morning outside of the door for her to remove. He slipped away without bidding the family good-by. On entering the room the servant found the sheets of the bed missing, and at once reported that the painter must have stolen them. After careful search a roll was found in a corner, which proved to be a magnificent picture of "Alexander in the Tent of Darius." It was painted on the missing sheets of the bed, and the artist had chosen this curious way of recompensing his hosts for their generous hospitality. — *New York Star.*

The Sweet-water Dam and the Land-owners. — Although the Bostonians who built the Sweet-water dam near San Diego, Cal., probably do not particularly enjoy the thought of the amount of cold cash which that for the present useless structure represents, yet they may be imagined as indulging in a grim smile or two at the way in which they met the recent verdict of a jury in the San Diego Superior Court. The owners of the 350 acres of condemned land covered by the reservoir had been awarded damages by the courts, but were not satisfied with the amount, and carried the case up. The jury in the Superior Court, the company claims, valued the land according to its prospective worth, and gave the plaintiffs a verdict for $122,675 or, say, about $322 an acre. Thereupon these sharp and hungry gentlemen rejoiced. But a telegraphic message flashed across from Boston, the floodgates of the dam were opened, the 5,000,000 gallons of water ran into the bay, and the company's agent remarked, in effect, to the claimants: "We would not deprive you of your land. There it is again. Take it." So their joy has been turned to sadness, and they find that by their greed they have not only lost a fair profit on their land, but injured the whole town of San Diego by cutting off a goodly portion of its water-supply. — *Fire and Water.*

English Praise of American Architectural Journals. — "In that room [the R. I. B. A. Reading-room] may be seen daily no less than seven illustrated journals of architecture and building published within the bounds of the great Republic of the West; and, possibly with sarcastic views, it has long been the custom to compare the progress of the Australian colonies with that of the United States. The seven journals from America, as all who come to the Institute may read, are not mere 'specimens' of Colonial or Western enterprise, but are journals whose managers conduct them as if to the manner born, and many of the illustrations in most of them surpass those of the British." — *Journal of Proceedings R. I. B. A.*

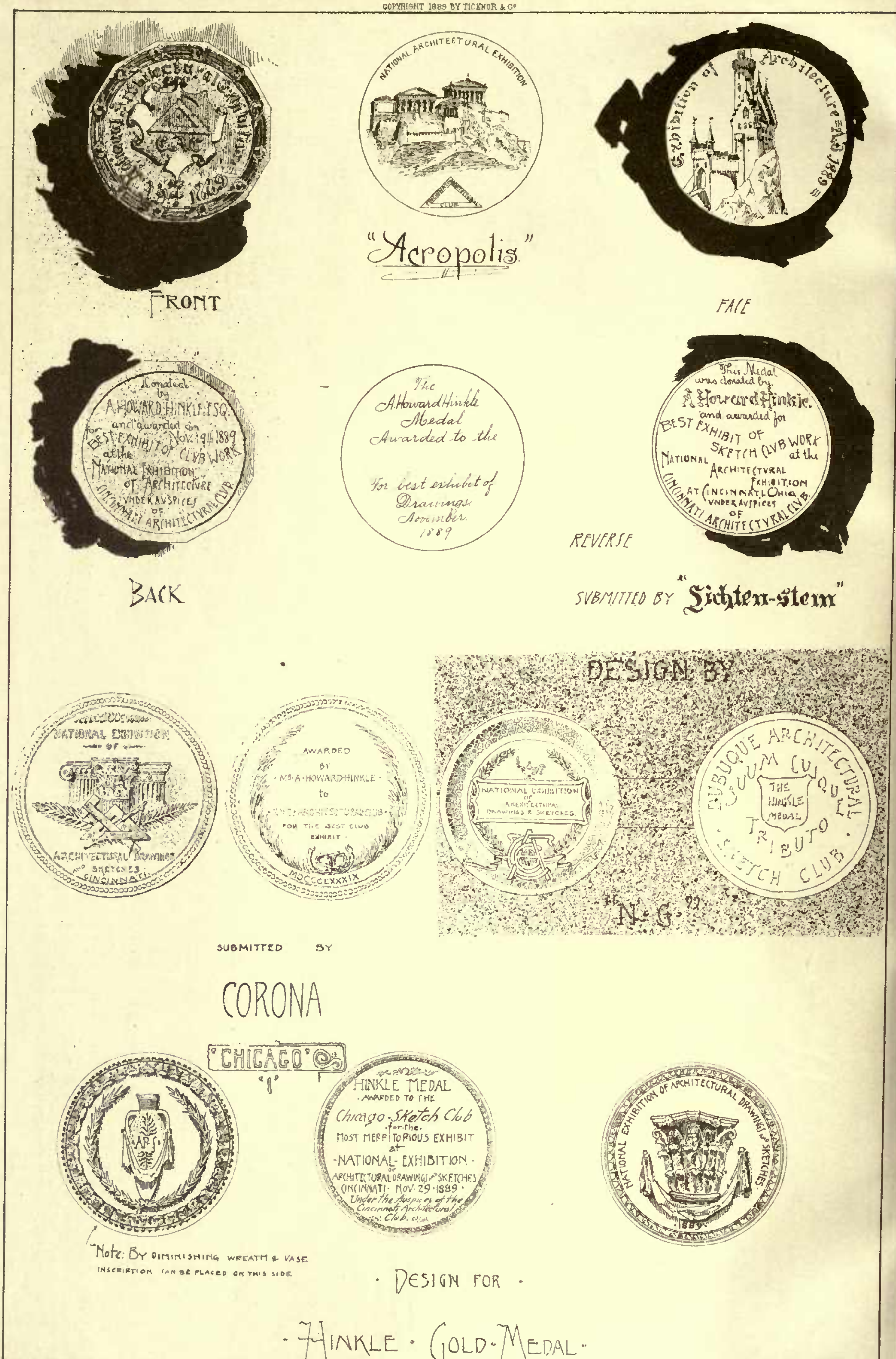
Repairing Terra-Cotta. — In the handling and re-handling of terra-cotta, of all kinds, it is liable to be chipped or broken, especially on the corners, where it is to be joined to some other piece of the architectural design. When this happens, it is best to examine the broken part, and if it has a slant outward or inward take a sharp chisel and light hammer and make saw-teeth indentures in the sharp part of the break, and then when it is in position point up the place with a cement composed as follows, which will gradually indurate to a stony consistency: Mix 20 parts clean river sand, 2 litharge and 1 of quick-lime, into a thin putty with linseed oil; if for red terra-cotta, color to the desired shade with Venetian red; if buff, with yellow ochre; if brown, with Spanish brown. The cement should be made all at one time, and the pointing up should also be so done as to avoid a variety of shades. When this kind of cement is applied to mend broken pieces of terra-cotta, or to mend broken pieces of stone, as platforms, or exterior or interior steps, it acquires, after some time, a stony hardness. A similar composition has been much used to coat over brick walls, under the name of "mastic." — *The Brickmaker.*

TRADE SURVEYS

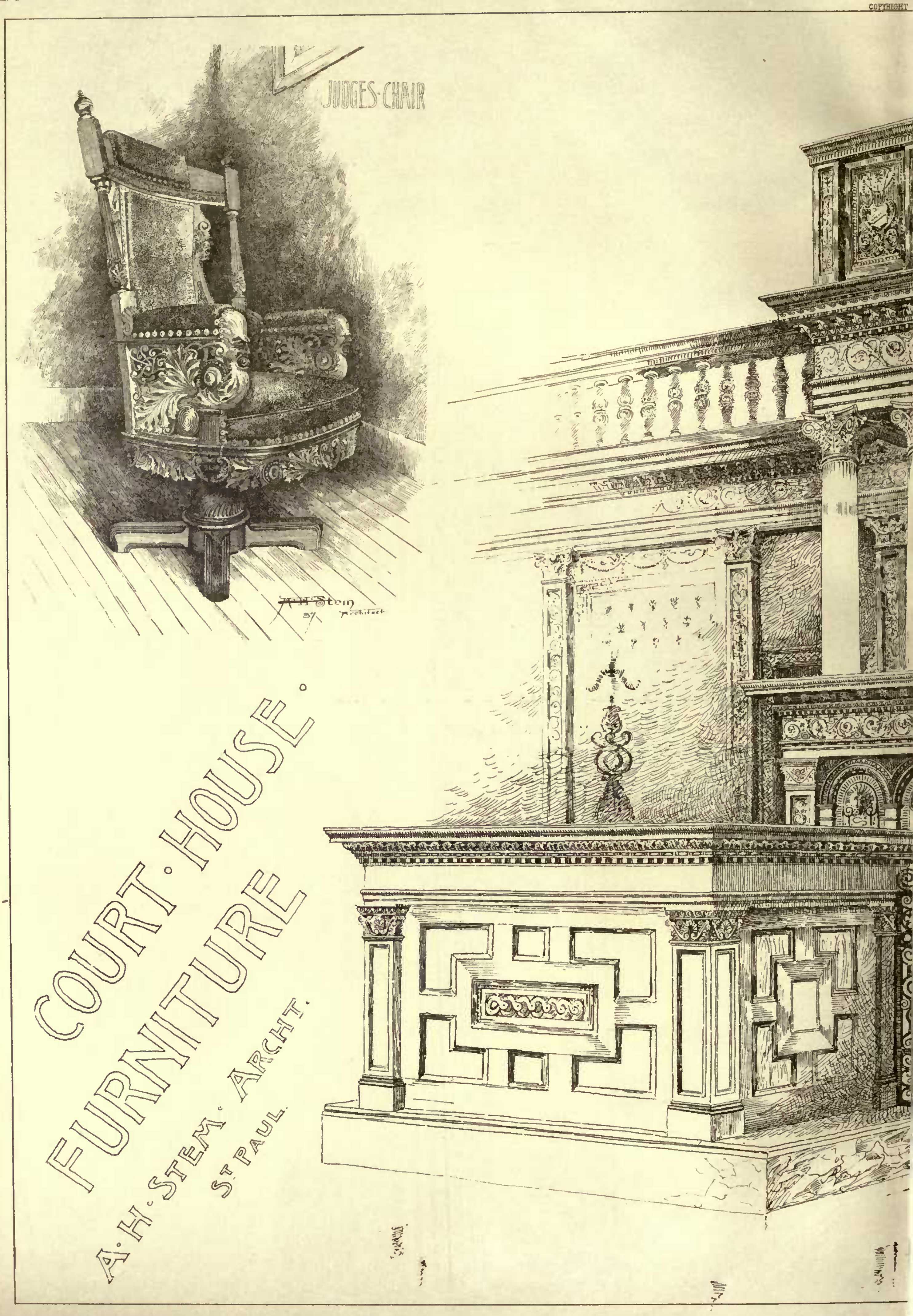
The tendency to buy more and more in manufacturing circles continues. Consumers seem to fear that prices may advance. Everything which throws light on that question is read. The danger, if there is a danger, can be guarded against by and through a proper understanding of the whole industrial situation. Economists have often pointed out that there were very poor grounds for the sudden expansion and advance of prices, which have disturbed healthful commercial conditions in years past. They have shown that the wild rush for supplies created speculative values, only to be followed by long reactions. Business men who have no time for essays and no regard for theories, judge by a few surrounding conditions what is best to be done. In every industry and channel of activity, a sort of inventory of capacity and demand is now being taken with a view of arriving at a practical conclusion as to what had better be done. These surveys are necessary in the present condition of commercial affairs. There is a readiness among manufacturers in every line to invest money and expand capacity, but the question they are asking is, What is wanted? The consumption per head of population of a long list of manufactured products is known, and capacity is kept as nearly as possible within those limits. Hence it is that commercial interests are more wisely and conservatively managed, and that the percentage of losses, as compared to the total volume of business, is declining. The contractors and builders unite in saying that this season's business has, on the whole, been the most profitable of any. In the four cities of Boston, New York, Philadelphia and Chicago, the expenditures for building purposes will, in the aggregate, it is computed, fall very little under one hundred and fifty million dollars. The greatest activity has been maintained this year in the smaller cities and towns. Reports from these places are not easily obtained, and are, at best, but fragmentary, but so far as information from reputable sources go, it shows that there has been an extraordinary outlay of money for house, mill, factory and shop construction.

The decentralization of industry is going on at a galloping pace. Equalized rail charges, no doubt, contribute to this condition. The springing up within two or three years of possibly two or three thousand new centres of industrial activity has had a more potent influence in strengthening and expanding business than the construction of ten or twenty thousand miles of railroad. This rapid multiplication of little industrial centres will continue, and will constitute the great and characteristic feature of American progress for years to come. New England will not monopolize cotton-goods manufactures or paper-making, nor Pennsylvania in iron-making. Breaking up of industries as regards location has set in, and the forces at work will erect great industrial communities where at present there is not a sign of life. Economical forces and unwritten laws will create a condition of things in this country nowhere else known. Cloth-mills and blast furnaces will be built side by side. In fact, this departure is seen in Pennsylvania, where Paterson silk annexes are built now under the smoke of blast-furnaces. Architects who speak of future probabilities are very confident that, unless strikes occur, as much building will be done next year as this. Iron and steel makers are nearly all preparing to enlarge their plants or build new ones. Last week, the announcement was made in Cleveland and Chicago that four new boat-yards would be started. West of the Mississippi, a vast amount of railroad and bridge work is in contemplation, and, as it is projected by wealthy railroad corporations, it will likely be done. The rush of small shop and factory orders, which has kept up since September 1, will not abate, as stocks of raw material among manufacturers and wholesalers are almost an unknown quantity. This, in fact, is the strongest feature of the entire business situation. Not only is there no accumulation of stocks, but high authorities doubt whether we have wheels and hammers enough to keep the country going with products. On the heels of this doubt comes the inquiry, asked too frequently of late: "Is there money enough?" If there are serious dangers lurking they will not take the country by surprise. Trade and manufacturing and commercial organizations are stronger than they ever were, and each and all are working towards more clearly-defined objects.

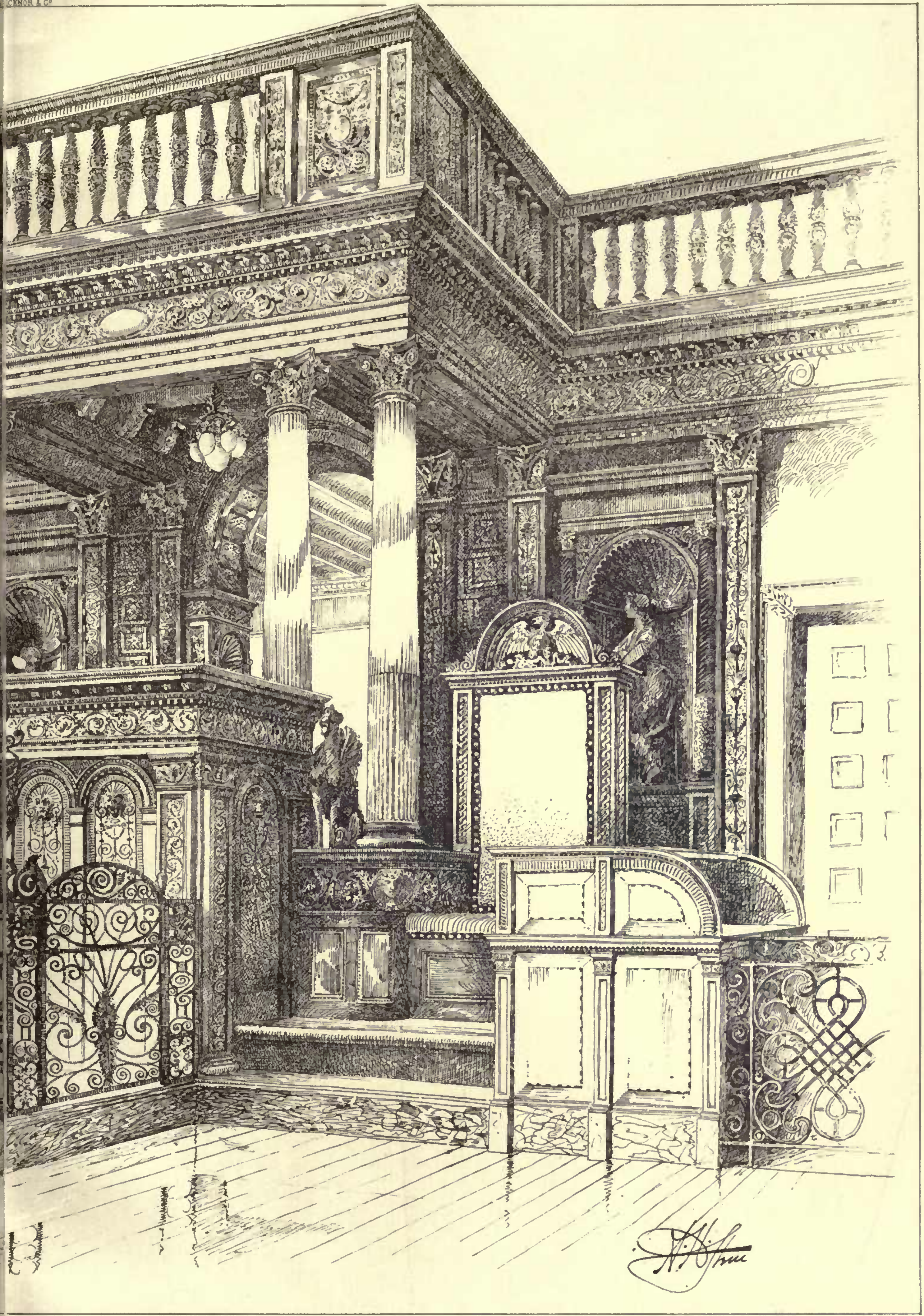
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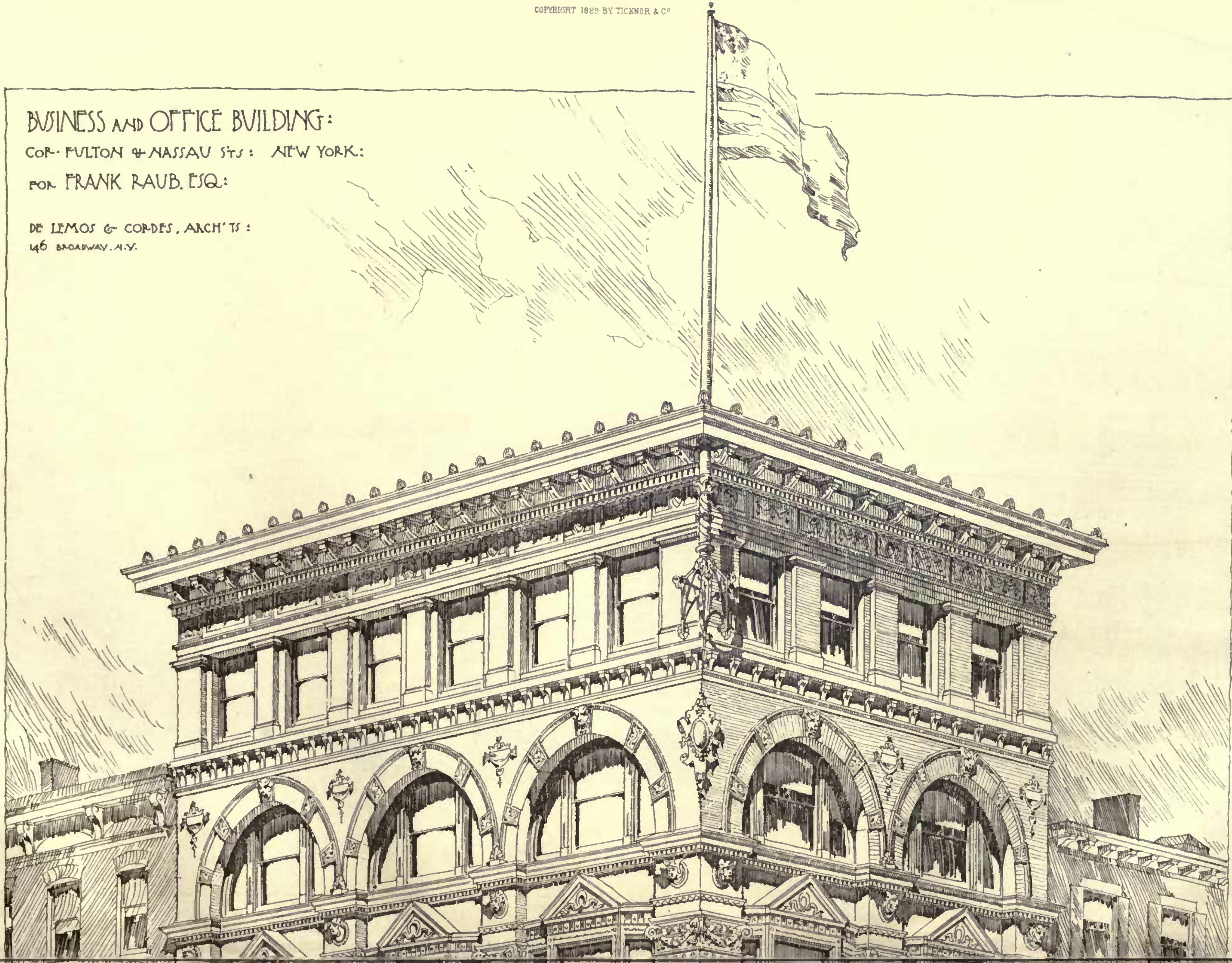
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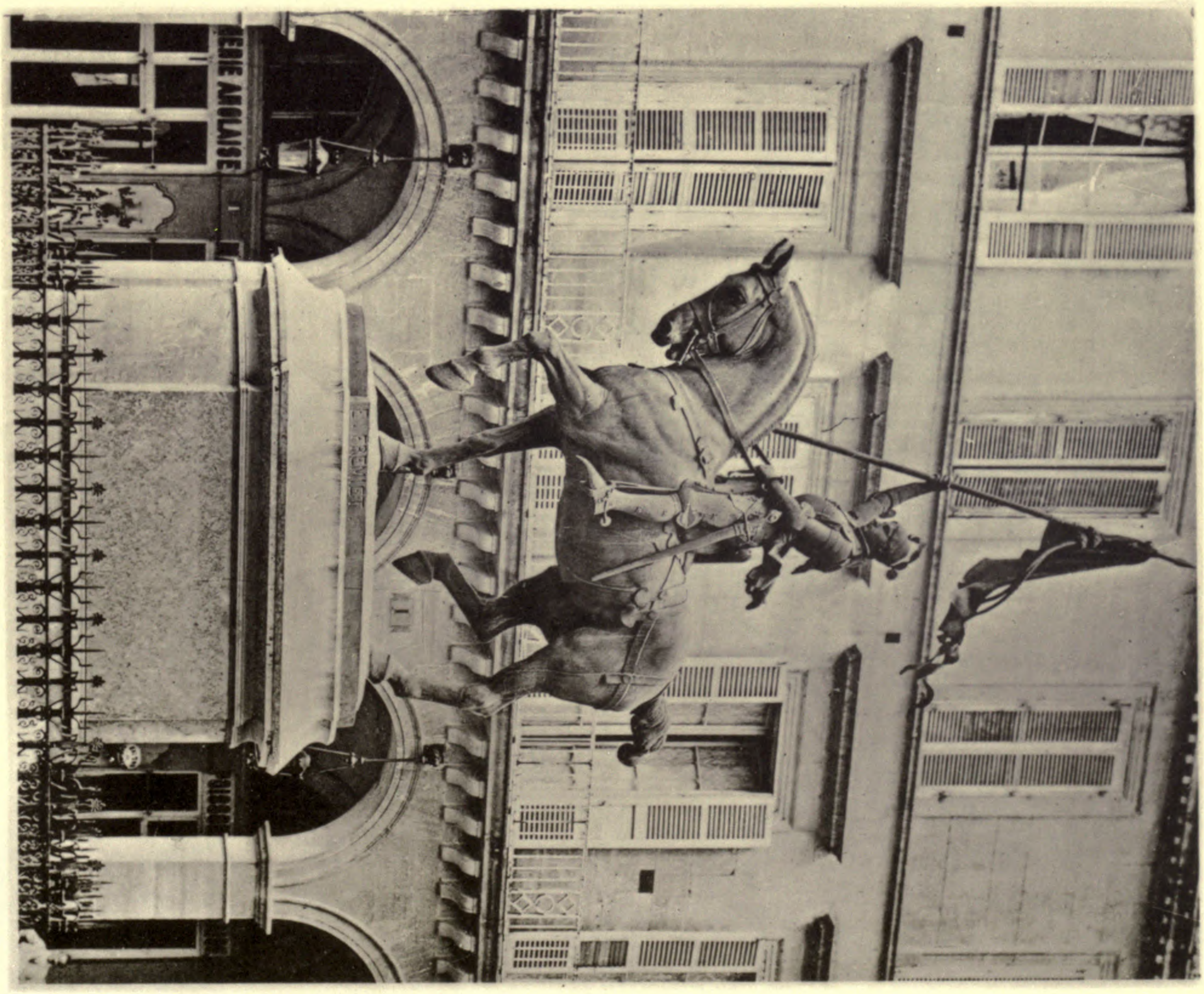


· HOUSE FOR MRS. R. H. RICHARDS · ATLANTA, GA. G. L. NORRMAN, ARCHT.

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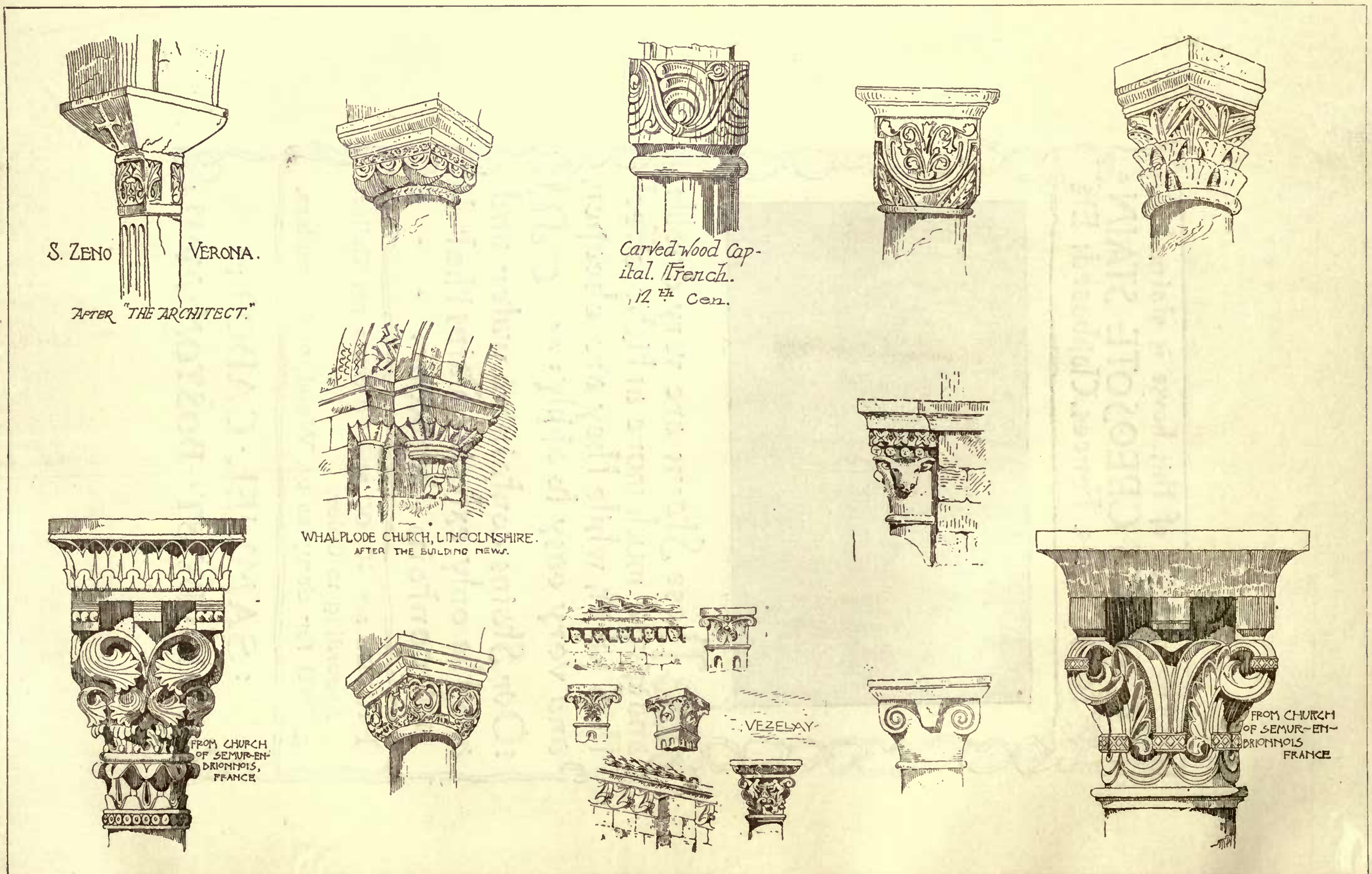
AT ORLEANS. D. FOYATIER, Sculptor.



AT PARIS. E. FREMIET, Sculptor.

JOAN OF ARC.

HELIOTYPE PRINTING CO., BOSTON.



ROMANESQUE CAPITALS.

The American Architect and Building News.

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NOVEMBER 2, 1889.

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OUR readers will remember something of the case in which Mr. Manly N. Cutter, a well-known architect of New York, was engaged to build an extension to a house near that city, and had a controversy with the owner about his pay, the architect claiming the usual commission on the cost of the extension, while the owner resisted the claim on the ground that the architect had greatly exceeded the stipulated limit of cost. According to the newspapers, the owner, a Mr. Morris, whose breathing apparatus was, perhaps, defective, requested Mr. Cutter to add to his cottage a room in which a person addicted to snoring could sleep without disturbing the other inmates of the house. It was accordingly arranged that the new apartment should be in a separate wing, accessible from the main house only through a bath-room, and that the walls between should be carefully deafened. Mr. Morris then went to Florida, expecting to find on his return the plan carried out, at an expense which, as he supposed, would not exceed five thousand dollars. According to Mr. Cutter's story, no sooner was his client out of the way than his wife, who was left behind, began to insist on the adornment of the snoring apartment with all sorts of beautiful things. Not only was it made a construction of stone instead of wood, but a splendid fireplace, with an outside chimney, was added; a carved frieze was ordered, to go around the room; windows of "Venetian" stained-glass, with allegorical figures, were substituted for ordinary sashes; the bath-room ceiling was domed, and the room hung with hand-painted stamped leather, and so on; while costly pieces of furniture were designed for building into the walls. When Mr. Morris returned from the South he was, as he alleges, startled to find that his five-thousand-dollar snoring-room had already cost twelve thousand, and that fifteen thousand more would be needed to finish it according to the designs. We can better imagine than describe the scene which probably took place between the spouses on the discovery of this fact, but the upshot was that Mr. Morris brought suit against the architect for sixteen thousand dollars damages, on what ground does not appear. This suit was thrown out by the court, while Mr. Cutter's suit for payment of his bill was entertained, and, after years of waiting, judgment was given in his favor. Mr. Morris, who is reputed to be very wealthy, availed himself, however, of the facilities afforded by our law for rendering it impossible for professional men to collect debts due from persons richer than themselves, and carried the case to the Court of Appeals, which has just decided that it must be tried over again.

THE matter has, however, gone far enough to furnish a useful lesson to other architects, the moral of which is that it is highly dangerous to assume that a lady has any authority to give directions in regard to any of her husband's affairs, including his building operations. To the profession, it would be incredible that an architect should, out of mere idle fancy, and without positive orders, convert a five-thousand-dollar snoring-room into a retreat which would dazzle a Sybarite; but it should never be forgotten that courts have nothing to do with facts or probabilities, but only with testimony, and that the number of women who, on finding that their husbands were enraged at having to pay three times as much as they expected for a given piece of work, would, on the witness-stand, take the blame on themselves, instead of throwing it on the architect, is very small. Of course, in regard to many building matters, it is necessary to follow the advice and directions of ladies, and these often fail to coincide with the intentions of their consorts, but by keeping in mind that beautiful feminine amiability, which shows itself in forgetting, at a moment's notice, all promises, directions, contracts or other circumstances by which the harmony of the domestic circle might be imperilled, the prudent architect will be led to provide, by notes taken at the time, memoranda in the lady's handwriting and other indications, evidence to which he can have recourse if it should ever be necessary to establish the facts in the case by something more convincing than his own assertions.

AN address was delivered recently at Worcester, England, by Mr. G. W. Hastings, President of the Sanitary Congress held there, which contained some curious statements. Speaking of the thoroughness with which sanitary investigations are now carried on, he mentioned that a dinner-party was given not long ago in the most fashionable part of London, at which sixteen people sat down. After the dinner, there was a reception in the same house, attended by about a hundred and fifty people, for whom refreshments were served. Shortly after the dinner-party, seven out of the sixteen guests came down with scarlet-fever, followed by two of the servants of the house, and a considerable number of the persons who attended the reception. The interval which elapsed between the party and the simultaneous breaking-out of so many cases of fever corresponded with the usual period of incubation of scarlatina, and the inference was plain that the patients must have been infected with the disease on that occasion. There were two children, belonging to the family of the entertainers, but these had been sent away the day before the party, and were neither ill when they went away, nor were they taken with the fever after their return, so that the house itself could hardly have been infected. An official inspector was sent to inquire into the case, and after thorough investigation of the circumstances he came to the conclusion that the fever was communicated not by contact, or by infectious particles floating in the room, but by something which the guests had eaten. Further inquiry, as to what each guest ate, showed that no one was attacked by the fever who had not taken cream, while nearly every one who had tasted any cream, including the reception guests, as well as those at the dinner, had been attacked. Among the servants, the cook and the kitchen-maid, who had tried some of the cream, were taken with the fever, while the others, who had merely handed it to the guests, all escaped. The inference was unavoidable that in this case the vehicle of infection was the cream, but it proved impossible to ascertain how the infection had been communicated to it, and nothing more certain could be derived from the investigation than a warning to be careful about all forms of milk and cream, particularly in times of epidemic scarlet-fever or diphtheria. Another, and rather more noted instance, shows conclusively that scarlet-fever is communicated by milk. A certain district of London was, in great part, supplied with milk from a particular farm. An outbreak of scarlet-fever occurred in the district, and it was found that the disease followed the lines of distribution of milk from this farm. Every one who drank the milk was not infected, but wherever the milk went, there were many cases. The sanitary authorities, after finding that the fever followed the milk route, investigated the farm from which the milk came, and found that all the cows but one were ailing with a trivial complaint, somewhat resembling the vaccine disease. They were, however, all milked as usual, and the milk of the healthy cow was mixed with that of the others. The inspectors had the milk of the healthy cow kept and sold separately, and no new cases of fever were reported from this part of the route; but on mixing it again with that of the

others, the fever reappeared. The conclusion of the inspectors was that the cows were affected with a bovine form of scarlatina, which was, by their milk, communicated to the persons who drank it, appearing as the ordinary virulent human scarlet-fever. It is curious that, on the Continent of Europe, it is generally considered imprudent to drink milk unboiled. Very possibly, in years gone by, severe epidemics have been traced, as in these more recent cases, to the use of milk, and long experience has led the simple peasants to apply, as a precaution, what is still the best method known for destroying disease germs, the raising of the liquid suspected of containing them to the boiling-point.

WE think it is useful occasionally to call the attention of our younger readers to points in the life of noted architects, as a reminder that professional success is not always, or even commonly, the reward of a course of life consisting in the scornful neglect of all difficult intellectual work, and the substitution for it of a certain feverish cleverness in making sketches, which excite the admiration of their author and his associates, but reflect his own disdain for prosaic inquiries as to the means of carrying them into execution. There are in the offices many men whose capacity is limited by the ability to dash in bold shadows in a perspective of a building about whose construction they know absolutely nothing, yet these men often regard themselves as being at the very pinnacle of architectural attainment, and, with their inordinate conceit of their own genius, and sneering malice against the plodders who try to learn all they can about their future business, do great harm to the younger ones, who take them at their own estimate of themselves, and try to imitate them. Prof. T. Roger Smith delivered, not long ago, a lecture on the life of Sir Christopher Wren, in which is well shown the development of a character which must, to some degree, be imitated by all those who wish to have important architectural commissions entrusted to them.

WREN was the son of the Dean of Windsor, and nephew of the Bishop of Ely, a man energetic enough to be impeached for his political opinions, and confined for eighteen years in the Tower. Although a clergyman, Wren's father was skilled in architecture, and was actually employed by King Charles I to design a palace, which, owing to certain misfortunes of his illustrious client, was not carried out, although the affair went so far that estimates were obtained for its erection. Young Wren was prepared by his father and a private tutor for Westminster School, and went from there to Oxford when only fourteen years old. Seven years later, after a distinguished university career, he took his M. A. degree, and was immediately elected a Fellow of the college. He remained in residence at Oxford, engaged in mathematical and scientific work, until 1657, when he was called to Gresham College, London, as Professor of Astronomy. Three years later, he was appointed Savilian Professor of Astronomy at Oxford, and in the next year received the honorary degree of D. C. L. both from Oxford and Cambridge Universities. Whether he had made any study of architecture during this period seems to be uncertain, but it is probable that he had, and that the fact was known, for in 1661 he was appointed Deputy Surveyor-General of Works, and in the next year was made a member of a small commission for the inspection of roads and buildings. In 1663 he was employed as architect of the Sheldonian Theatre at Oxford, his first important building, so far as is known, and still one of the most conspicuous buildings in the city, and in the same year designed the Chapel of Pembroke College at Cambridge. Before the end of the year he was invited to plan the fortifications of Tangier, in Morocco, but declined, and at the same time was chosen to examine and report upon the condition of the old St. Paul's. He advised at this time the demolition and rebuilding of portions of the structure, but it was not until 1666, after the great fire had destroyed all but the walls, that he was commissioned by the King to design a new edifice. His fame as a scientific man and ingenious inventor, which he had won in learned society at Oxford, appears to have supplemented very effectively his rather short experience as an architect, for, after the fire, besides St. Paul's, he was employed to rebuild fifty churches in London which had been destroyed. How he acquitted himself of this task every one knows. Later in life, he became the President of the Royal Society and a member of Parliament, and died at the advanced age of ninety-one, and was buried in the middle of his great cathedral, where his tomb has for a hundred and seventy years attracted the attention of nearly all visitors.

PROFESSOR CHARLES H. MOORE, of Cambridge, has excited a good deal of talk by an article in the *Atlantic Monthly*, in which he repeats, what every painter knows, but few, in this country, dare to assert, that America presents very little landscape attractive to an artist's eye. His idea, it is needless to say, is received with indignation by the people who find the triumph of art in pictures fifteen feet square, depicting ranges of mountains of enormous height, down whose sides pour the tallest cascades on earth, while buffalos prance about in the foreground, and Professor Moore is scornfully accused of borrowing his ideas from Mr. Ruskin; but the idea is none the worse for having been expressed, most truly and nobly, in the "*Lamp of Memory*," and American art owes a good deal to Professor Moore for repeating the lesson in a new form. Not only, however, does his paper point out that a landscape pure and simple has but a transitory charm unless connected in some way with human sentiment, but he goes farther, and says that "of village architecture we have never had any in the country worthy of the name. There is not a village in the land whose streets, so far as their buildings are concerned, would ever tempt a painter of discernment to linger and make drawings." Although this assertion seems to have excited more adverse criticism than any other in the article, and Professor Moore is charged with wilful blindness to the beauties of American villages, we venture to say that architects, who ought to know something about the matter, will unanimously support it. Although a few towns that we know of, particularly Nantucket, Kingston, R. I., and one or two more, afford many bits of sentiment, charming to us, who can understand the associations which hang about their peaceful decay, the charm comes from the associations alone, and not in any degree, as it would in Cluny, or Rowsley, or Brienz, or Perugia, from the beauty of the architecture which may be visible. No way has yet been devised for making a frame building, covered with clapboards, and half rotted away, look anything but mean, repulsive and contemptible, and as long as we build cf inch boards, and our rivals across the water build of cut stone, so long will at least their ruined buildings be more attractive than ours. No matter how much art may have been lavished on the wooden cornices and pilasters of a colonial building, the cornice, split for half its length, and showing tumors of dry-rot fungus, and the pilasters with the lower ends rotted off, while they may interest an antiquarian, or an architect in search of detail, will disgust artists and the public for which they paint, while a structure of the same importance in stone, with its bit of tracery in a window, or its carved gargoyle under the gutter, or its patron saint in bas-relief in the gable, will be delightful, even though its tottering walls may be held up by buttresses, and cow stalls and stacks of hay may appear through the cusps of the tracery. It is due to our architects to say that they generally appreciate this fact, and even wooden houses are built in a far more permanent and simple manner than they were years ago, while many have now their stone substructures adorned with work which will please those who see it, long after ornamental wooden details, of the kind favored by our grandfathers, would have been buried in paint, or have rotted away altogether.

THE hundreds of architects who use the telephone will be interested to hear that an important reduction in the price of telephone service has just been made in France, as the result of the taking possession by the Government of all the telephone lines. While under private management, the annual subscription for telephone service in Paris was one hundred and twenty dollars a year, and in the other large cities, eighty dollars a year. Under Government management, the subscription in Paris is now eighty dollars a year. In two or three of the other large cities, where the cost of construction is increased by the necessity for carrying the lines underground, the subscription will now be sixty dollars, instead of eighty, and in the remaining towns the tariff is reduced from eighty to forty dollars, but with the condition that subscribers on new lines pay something toward the construction of the lines. The telephone company, whose lines were forcibly taken by the Government, protests and threatens, and an attempt will probably be made to recover the property, but, meanwhile, the subscribers rejoice.

JEAN PAUL AUBÉ.[1] — V.



Statue of General Joubert. J P. Aube, Sculptor. From *L' Art.*

ASKING, one day, one of the most distinguished French sculptors why it was that a man of Aubé's capacity should have to wait until he was fifty years of age before he could have a chance to execute important public work, this answer was given: "It's all a matter of influence. Politics is our greatest bane. The moment a politician is interested, the chances are that a poor statue or monument is brought into existence. They rarely have anything to do with a good sculptor. Then there are other influences much stronger than a love of art. Chance and individual effort have produced all our fine works. If favoritism happens to choose a good sculptor, so much the better. One of the most serious obstacles that our art has to contend with is the enormously increasing number of young men of more or less talent but little genius. Most of them are poor, and they expect the Government to support them. The result is that, in order to help these aspirants, better men are neglected. Our high-class sculptors barely earn a living, especially those who will not employ assistants. Take Fremiet for an example: he has been producing sculpture for more than forty years, he does all his own work, yet he must still keep at it in order to live. Falguière is not overcrowded with orders, and Rodin, though engaged on a life commission, has all he can do to live comfortably. Dalou has an immense monument on hand, but, being one of those who won't employ help, he will gain little money. Aubé's sketch for the Gambetta monument was by far the best one submitted, but there were other facts of potency at work to favor a just decision. Fremiet has never received an important commission from the State, and he is over sixty years of age. Our great artists, especially the sculptors, have produced themselves and made the fame of their country in spite of her. There are a great many surprises in the real history of French art. Men of the slightest ability often enjoy the widest public notoriety, and those of the rarest genius are not known beyond the narrow circle of a few professional friends. If you should ask certain sculptors like Rodin, Fremiet and others to tell you what was one of the best pieces of nude modelling that had been made in France during this century, they would point out a figure called 'Echo,' owned by Alexander Dumas, and made by an unknown sculptor (so far as the general world is concerned), named Adrien Gaudez, a great artist and a learned man in his art. Paris is the centre of the modern world of art; it is also the cemetery of many able, living artists.

"Besides, there is so much passing art to attend to that men who are richly entitled to serious consideration, especially if they are undemonstrative — and Aubé is of that kind, are too often passed by with no more notice than is given to the latest aspirant. Our greatest men have had to go through the hardest struggles. There is an immense lack of discrimination with the majority of artists and critics, and a common, pretentious man is spoken of in the same terms as those employed in designating a genius.

"True art-life in Paris is a most terrible battle — so terrible that one is forced to think at times that, after all, the people care nothing for it. If the real history of our best works were traced out, I am certain that it would be found that it was the individual artist, helped by a friend or two, to whom their existence is due. Large, positive natures are generally disliked until after they are dead. It is human nature to neglect men like Aubé and to kill those like Rodin. The same may be said of Dalou, who is a natural fighter, and loves it. He is as radical in art as he was in politics. Such a man is too revolutionary for the even tenor of the great average. Either would destroy the other if it could.

"I know it is said that nowadays writers and art-lovers have much, if not all, to do with the fortune of an artist. It is true to a certain extent, but they always follow in support and never lead. The fortune and the destiny of artists are in the hands of each other.

"Art-history constantly repeats itself, and the sad days of Millet come round in unchanging regularity. It is a drama where the actors seem to be pushed on and off the stage like so many wooden men by an offended fate."

AUBÉ AS A MAN, SCULPTOR AND ART-TEACHER.

Aubé is a thorough Frenchman, an intense Parisian, and a splendid representative of both: a little above middle height, slightly gray; weighs about one hundred and sixty pounds, finely made, of easy movement, and not over-fastidious in dress; is fine-looking, frank, cordial and modest to a degree; a close, ready, clear and very learned talker on art and other matters, especially those concerning the welfare and progress of his country. In his likings for art he is widely cosmopolitan: a great appreciator, a keen critic, above all of his own works, and of refined and sound intuitions. Extremely happy in his family relations, a great lover of tranquility, and much given to musing. Thought to be, by the ordinary observer, a careless, thoughtless, lazy sort of boy and man, in fact he possesses a full, rich, artistic temperament, and has simply followed where it led him. To this he added a certain amount of outside energy, in order to really make something to expose in the *Salon*. Has no idea of dates, and is quite indifferent to what critics say of his work. Was an early appreciator of Rodin, and one of his firmest friends.

Speaking with Falguière in regard to what he thought of Aubé, he stopped his work and said: "What do I think of Aubé? It would take me some time to put into proper shape all that I think of him. It's no easy matter to sum up such a man. But I will say now that there is nothing fine that you cannot write of him. He is a great artist and an extremely fine man, one of the rarest and choicest of spirits, fine and sincere in every way." Other artist friends of Aubé paid like tributes to him.

As a sculptor, Aubé's object is life, simple movement, and what is understood as the architectural side of sculpture — a quality not too common in modern times. He is a great believer in nature, and is thoroughly impregnated with the love of truth; believes that the human form sings all the hymns of beauty, and agrees with all the great artists that the prudery of modern Christianity is the greatest enemy of the art of sculpture. Aubé's early modelling, though always refined, had not that firm freshness that characterizes his later work. It was like that of a sculptor who was feeling his way, and more occupied with sentiment than with execution. In regard to this momentary condition, Dargenty, in *L'Art*, 1883, made this observation; "Why does M. Aubé, in his 'Bailly,' which is very interesting, firm on his legs, intelligently modelled, as is everything that he does, have the singular fancy of making the flesh of his figure like rumpled silk? He knows, however, better than any one that different kinds of flesh, dried up as they may be, have a quality which stuffs have not, and that it is not admissible to use one model for both. In disregarding this rule he has benevolently diminished the merit of his figure, though it is none the less one of the best pieces at the *Salon*."

It has already been said that the sculptor followed his own temperament, and trusted to nature as his best assistant. He followed it with safety because it was full, rich and faultless. It led him into neither weakness nor extravagance. It relieved him from the anxiety and uneasiness that has haunted other and greater artists, and assured him, in fortunate adequacy, of the true sense of the old proverb, that "each day suffices for itself." He has always been able to say that "my thought and my life are enough for me." He relied upon the unconscious spontaneity of his soul with perfect confidence and untroubled ease. Beauty and grace came to him without effort, and new and strange tasks brought their accompanying strength. The greater the demand, the more ready and prolific were the resources. Formulas he had none; the theories of schools and the processes of ingenuity found in him neither sympathizer nor defender.

His sense of beauty was an endless field of flowers, and he gathered them at his will. From the "Syren," through Pan's world on the vases, to Gambetta and the colossal symbols of "Force" and "Truth," he culled and worked on in calm continuity.

The necessity of the day organized its own progress, its gradual production and its eventual success.

Whatever were the laws that underlie and govern all these things, it was not the artist who asked questions concerning them or dreamed of prying into their mysteries. He rode quietly on top of the waves, and was quite willing that the deep should answer unto itself. The movement, the domain and the surprises of genius were indifferent to him. His art, the expression of himself, was the all. He had no doubts, for he worked. The urgency of expression, the pleasure of production, its constant variety of succeeding needs and changes, were his world.

In spite of the fact that Aubé has succeeded in making these monumental statues for the Gambetta memorial, and had previously worked on large figures for other sculptors, his preferred fancy is for smaller figures of mythological subjects — cupids, nymphs, goddesses and the creatures of the imagination. His first serious art-studies were made with the intention of becoming a painter, and, had he pursued that branch of art, he would have been the peer of Boucher himself. It was on the Haviland vases that he ran the whole gamut of gallant fancies, rivalling both Clodion and Cellini in variety and extent of individual design. They represent a long hymn of spontaneous sentiment. The mind of the artist was so closely identified with nature that they were almost one and the same, and they went sailing along like twin desires, leaving their transforming selves upon each vase according as they were affected by caprice or circumstance: a hymn of happy artistic struggle, of unconscious contention, of ideal attitudes, joyous, playful and almost ephemeral; genius creating a world for itself, reproducing in unrestricted freedom the movement of the emotions; a riotous and enchanting fancy strung out on the most beautiful artificial form in art.

On his door, Rodin lives through a sombre journey with the

[1] Continued from page 168, No. 720

phantomed souls of the cursed dead, while Aubé, in his vases, dances through the whole fairy realm of sympathetic fancy.

In this kind of art-expression Aubé has no superior. His statuettes were accepted as masterpieces — marvels of decorative sentiment, of gracious ease and the best of taste. It was an expression of art as novel as it was modern, exquisite, delicate and voluptuous.

It was this seductive understanding of fanciful subjects, this natural sense of revelling in the gracious movements of the human form that the sculptor has impressed upon his larger works, and which gives them an intimate art and human charm quite superior to contemporaneous sculpture. It gave to the statue of Boucher its attractive personality; to that of Gambetta, a very living presence, just as he was when rousing all France in defense of the country; it made the nervously-modelled Bailly the only oath-taker, and it brought back out of the dust of ages the ancient chief of Paris merchants, Michel Lallier, in all his proud dignity of office.

There is a living presence about all these statues, a discounting of years that is both rare and exceptional. Is it any wonder that the French love to live over the great hours in their history, when, by the lifting of the artist's hand, the immortal spirits who consecrated those hours are made to pass in solemn procession before their welcoming eyes? Is it any wonder that sculptors like Aubé rejoice in reviving history in all the authority and charm of poesy, or giving to it a reality that words cannot create? As long as there is any Republicanism in France the dust of forgetfulness will never fall upon Gambetta; nor the age of the Constitution be counted by centuries, so long as the grave and dignified statue of Bailly is in existence. The whole history of that eventful scene at Versailles centred in Bailly, and his visage, his manner of expression and even his clothes become matters of the greatest importance.

If the long line of cadaverous images set up to commemorate American worthies had only a spark of this art of resurrection, if they could only distantly intimate that flesh and blood had once animated the forms of their originals, or that any sun had ever shone upon their benighted heads, the charitable archæologist might be persuaded to classify them in the doubtful list of primitive sculpture. If, with all our museums of art, all our prodigality of throwing money at art, we could only get hold of the idea that art is *life*, and sculpture something more than a mummy!

It has already been intimated that Aubé's statue of Shakespeare was not generally admired by the critics, though the artist's friends felt it to be a superbly conceived and understood work. Paul Belon, in the Paris *National*, declared it to "be completely beautiful, certain to be admired, some day, by the public in the foyer of the Comédie Française, by the side of Houdon's "Voltaire," where it belonged, and where the justice of art had marked out a place for it. Never has the author of Hamlet, such as one imagines him to be through all his works, appeared with equal intensity of life, nor in such a moving form. The "Shakespeare," by Aubé, is a majestic evocation of the poet of comedy, of the powerful thinker who was also undoubtedly a marvellous comedian." And Edmond Jacques, in the *Intrasigéant*, said that "it was the Shakespeare of Shakespeare, thin, slender, comic and grave, poet and fool, comedian and creator. A strange figure, philosophic and attractive. Aubé is another great one, who is not a member of the Institute, and consequently to be felicitated and applauded."

To the writer, this statue is the most vivacious, truthful and suggestive expression of the subject of any of which he has any knowledge; in fact, it is the only one that seems and does give the impression of a person interested in himself, and trying to interest some one else. To perform this just and pleasing function the position and attitude of the figure is eminently fine. It is a charming and forcible piece of acting of itself. An actor worthy of any play and of any stage. An extraordinary example of illustrative characterization, of deep intuitive insight into a difficult subject. And what a point to arrive at in such a subject. What a subject to attack! If not as solemn and impressive as the "Bailly," as martial as the "Joubert," or as stirring as the "Gambetta," it is far superior as an expression of the sculptor's mind, and beyond them all in masterly suggestiveness. Shakespeare himself, watching and waiting in pleasing and earnest consciousness for the responsive understanding of the centuries, "My spirit is thine, the better part of me."

In the appreciation of the great bard Aubé richly deserves to be classed with Dumas and Hugo, who told their countrymen what the poet did,— the sculptor has produced the man and the actor. It is a fitting and delightful fact that a Frenchman should thus interpret him.

An indefinable and indescribable charm of this, and of all of the artist's statues, is their complete consciousness. It is an immense quality, perhaps the very greatest that an artist can possess. It embraces the best Greek statues with a cloud of glory. They are simply and wholly concerned with themselves. The "Shakespeare" gives that impression to the writer, he seems to be holding a conversation with himself. Following with his whole body, in manly gesture, the subtile action of a passing thought, the thought, worthy of all great creators, that the coming centuries would wait upon his words. The attitude and purpose of this statue is so finely related, and its illustrative intention of so high a character that it belongs among the very best French sculpture of any time. As an artistic and intellectual interpretation it is equal to the great "Voltaire," by Houdon, and well-worthy to stand beside it in the most justly renowned theatre in all the world.

The "Dante," a most scholarly and lovely impersonation, is intended to illustrate this sentence: "I do not know whether it was my intention or by chance, but in walking among the heads, my foot knocked hard against the face of one of them. Its soul weepingly cried out, 'Why do you tread on me? Why torment me?'"— *Dante's Inferno.*

The statue is a trifle larger than life, and is most appropriately placed in the little shaded park in front of the College of France — on its left, rises the new and splendid edifice of the Sorbonne, and before it, passes the Rue des Écoles. Close by is the Panthéon, the Law School for all France and the Boulevard St. Michel. "Dante" stands in the midst of a never-closing human comedy, whose hollowness he sounded to its last echo, and whose bitterness he tasted to its lowest dregs. Even in deaf bronze, and after many centuries, he continues his sad journey through the abodes of voiceful shadows, not as when the phantomed Virgil led him, in doubt and fear, but accompanied by myriads of sympathetic souls who chant his fame and wonder at his destiny. Yet he goes alone, the silent man. On Rodin's door he is surrounded by all the varied world to whose imagined existence he gave an immortal continuance, but there also he is alone. Dante is the representative of isolation, he who justly curses the meanness of mankind. Rodin and Aubé are the only sculptors who have understood the Florentine singer, in sculpture, and who have becomingly represented him.

There is a curious incongruity in the "Dante," though he is supposed to be in hell walking among the heads of the damned, his own head is adorned with laurel, a tribute of fame paid to him long after he had quitted the haunts of men. The sculptor seems to have anticipated time, and placed upon the poet's brow the wreath which all succeeding ages have united in sanctioning.

Aubé went into the School of Fine Arts, because there was no other place for him to go, but while in it he became convinced that it was not the best place for a student. When he began to work as a sculptor, he saw more clearly than ever its grave defects of organization and detailed method. Summing up in later years the results of his School studies, he is forced to say that he derived little advantage from attending it, because its methods were not only too restrictive, but utterly inapplicable to the development of art-natures like his own. He says: "The School has certain rules and arbitrary methods to which the pupil, no matter what may be his tastes, tendencies or temperament, is obliged to submit. In the nature of things, the majority of the pupils who go through the School lose whatever individuality they may have had, and become simply routine followers of its teachings and methods, often, of course, possessing great skill in the manipulation of the material in which they work, be it clay or paint.

"The students who have a positive individuality of temperament, and who go through the School without being completely ruined, find themselves so burdened with its training that they regard the latter as an enemy to their freedom, which they are obliged to contend against all their lives. Some of these students succeed to a considerable degree in throwing off this burden, and showing in their works much of their original temperaments, though there are traces, more or less distinct, of their school-training. Occasionally a student, like Carpeaux, passes through the School, wins the Prix de Rome, and at the same time asserts with persistent demonstration and constant protest, his own individuality and dislike of its rules. Carpeaux would have his own way at any price.

"Dalou and Rodin are much more radical than I am on this subject, though we agree on general principles. They would close the School, I think. My feeling is that the methods pursued at the School are not those best calculated to develop an artist. They would hurt, if not destroy, a fine personality if he remained too long in it. The School represents the tendencies and methods of an organization, and the moment you organize a system of art-instruction, you injure its value for the best art-temperaments.

"Even a committee of artists are an uncertain body. Get them together, men of the best talent, to judge a matter of art, no matter what it is, and they seem to lose their character and intelligence as individuals, follow no guiding idea, and are at the mercy of caprice or fanciful criticism. Thus they are more likely to condemn a work because of some inevitable fault than to defend it because of its merits. It is a strange fact, and one of the reasons why a school of art is likely to be narrow and bigoted in its rules and practice.

"A student might remain with safety at the School for two or three years, but I should question a longer time. The purpose of an art-school should be the development of the temperament of the pupil, not the inculcation of theories. Theories in matters of art are generally pernicious."

The detailed faults of the School, as defined by Aubé, are precisely those described in the articles on Rodin.

Aubé is a practical exemplifier of his views on art-education, for he has taught for several years, two days and two evenings of each week, in a city art-school at No. 19 Rue des Petits Hôtels, at least four miles from his own home.

No sculptor in France, and I doubt if any sculptor of Aubé's genius anywhere, or at any time, has had so much to do in an intimate, professional and agreeable way with other sculptors as he. His easy, undemonstrative temperament, his generous cosmopolitanism, his moderate views on art-matters, his human interest in all that pertains to his profession, and the absence of any revolutionary element in his work, has made him generally beloved both as man

and artist. Fortunate in making early friendships, he is still more fortunate in retaining them through all the rivalships and contentions of an active professional life. A constant participator in many important art-competitions, and a powerful opponent against men of larger fame and publicity, he has been able to sound with certainty the character of men, and to understand the tendencies that weigh in the decision of such matters.

None knows better than he the whole round of vicissitudes that beset the life of an artist, and how strangely unconnected they are even with their own histories. "It is very difficult," he observes, "to get at the real personal history of an artist; the two are often strangers to each other. It is rare, very rare, that the life of a great artist is known to the world. It, as well as his fame, rests more tenderly and securely in the hearts of other great artists. They see and feel each other through their works. I doubt if words are adequate to tell the story of a real artist, or translate the precise meaning of his thoughts."

The sculptor is a firm believer in the influences, activities and life of his own day and generation, and that the first pleasure of an artist should be to sympathize in and work to express that life, its activities and its influences.

For one of its expressions, he would like to see all industries influenced and dominated by art. "Whatever is worth doing at all is worth doing well" is a saying which he recognizes as law, and he would have every article of man's handiwork beautiful as well as useful, artistic as well as serviceable. He teaches art in order to help realize this great end. Like all true educators, he believes that the best teaching, at all times and ages, is none too good for all or any pupil. To the thorough application of these two important principles Aubé has given labor and thought without stint. For their full accomplishment, he thinks no sacrifice is too great. The results of his teachings at the above-mentioned school are of the most encouraging character, for the pupils represent in their progress and final graduation the effects of the superior instruction they have received.

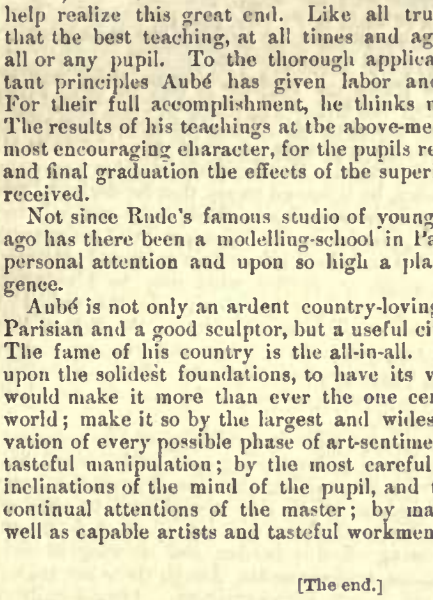
Not since Rude's famous studio of young sculptors of forty years ago has there been a modelling-school in Paris conducted with such personal attention and upon so high a plane of educational intelligence.

Aubé is not only an ardent country-loving Frenchman, an intense Parisian and a good sculptor, but a useful citizen in its largest sense. The fame of his country is the all-in-all. To still more enlarge it upon the solidest foundations, to have its value felt everywhere, he would make it more than ever the one centre of the art of all the world; make it so by the largest and widest generosity in the cultivation of every possible phase of art-sentiment and every tendency to tasteful manipulation; by the most careful respect for the natural inclinations of the mind of the pupil, and the utmost personal and continual attentions of the master; by making intelligent men, as well as capable artists and tasteful workmen.

T. H. BARTLETT.

[The end.]

THE RESPONSIBILITY OF ARCHITECTS.



Relief on Bach's Monument Eisenach, Germ'y by Prof. Donndorf

THE report of the committee of the Western Association of Architects on legal decisions presented at its last annual convention contains, amongst other matters, the following on the liability of architects:

"The liability of the architect has been pronounced in a number of decisions, of which the following have come to the knowledge of your committee:

"*First Case.* — An architect in this city had charge of the erection of a house for a widow. The contracts had been let to a carpenter in one. It provided the architect to be umpire, and payments were to be made on his certificate. Specifications provided a 'first-class job.' Through neglect of the architect, the work was carried out poorly, extremely poorly in many respects, so that the widow refused to pay the final certificate. The case went into court, and the judge decided that the widow was bound to pay the architect's certificate, just or unjust, and that if she had any case at all she might bring suit against the architect. So she did, and recovered $800, which was paid by the architect.

"*Second Case.* — A widow erected a mansion under the charge of an architect. She had difficulty in obtaining the plans. Her directions as to changes were not heeded, and she became frightened enough to consult a lawyer. A private superintendent was employed. The architect was notified in writing as to changes being required here and there, and as to work being carried out carelessly. The house was completed and every certificate was paid, since it would have been useless to contest the payment of any of them. There was no evidence as to fraud, though such there was undoubtedly committed. The widow then sued the architect and recovered judgment for $4,500, which remained final.

"*Third Case.* — A citizen erected a block of houses during the winter. The architect neglected to provide means for keeping out the frost, and allowed the mason to build dwarf walls upon the frozen ground. Through this the building became to a considerable extent damaged, and the owner brought suit. The first verdict obtained was $1,400 against the architect, who appealed and received, incidentally so, as it would appear, an order for a new trial. The case was thereupon tried again in another court, and verdict was obtained against the architect for $1,900. The case had been tried more effectively, and the facts brought to the understanding of the jury.

"In all these cases the specifications had a preamble in which the architect was declared to be, in so many words, sole arbiter. Doubtless there are many more similar cases on record.

"In case an architect should not thus expressly declare himself to be sole arbiter, he would not be excused, but held under the rule of established custom. If, however, an architect expressly declares that he is not arbiter, and had nothing to say and to rule, he could, of course, not be held liable. But would not his position be simply pitiable? No respectable architect would like to be under such predicament.

"Every architect should be fully aware that his profession is one that may entangle him in scores of liabilities, and he should prepare himself accordingly. He 'professes' to know, and ought to know. He stands on the same legal ground with every other professional practitioner, with this difference: that his malpractice is far more clearly and positively established than is the case in any other profession. The preacher has nothing to fear on this score. Little more has the land agent. Slightly more still the doctor and the lawyer, but nearest to the architect comes the operating surgeon. Many law-suits have established the certainty of severe consequences to the purse of the surgical operator upon human bodies when he commits a blunder or even an error.

"There is nothing more certain than that in all cases the architect is legally and pecuniarily liable for every blunder by him committed, or under him, through the agency of any of his employés. The responsibility on this account is far-reaching, and surpasses that existing with any other profession.

"Under his charge, a building must come out to be constructively correct, and the work by him accepted and certified to must, in fact, conform to the requirements established in the specification. The certificate by him given must be arithmetically correct. If by error he should make it too little, the contractor most assuredly will call for correction before collecting it. But if he should make it too large, the contractor may thievishly go with it to the owner, who, on his part, may cash it, and the result is that the architect is liable to the owner for the difference, which he is bound to pay, and look to the contractor for reimbursement. In case such contractor should have the impudence to begin suit against an owner for recovery of an overdrawn estimate, he cannot recover the fictitious amount, because the court would correct the error when satisfactorily proven.

"A liability as to sufficient construction can readily be taken care of by the intelligent and well-educated architect. But serious entanglement may result in the dealing with a contractor who may be ignorant, may be dishonest, or both. A pecuniary liability may be obviated by declining certificates for payment. But what becomes of the work which the architect has at his heart? what of the remuneration coming to him? what of his time and professional standing? The contractor has all in his hands if he actively or passively defies the result. Of the two, the thievish contractor can be tamed, but with ignorance — so the old story is — even the gods combat in vain. A contractor is his own free boss. He elects his foreman, elects his workmen. An honest and knowing boss can have no great trouble on the score of poor work. But the architect must trust chance. Must he? If he fairly conceives the responsibilities on his shoulders, he will not. He will, with good conscience and tact, elect bidders known to him as honest and expert men, or such as are properly recommended to him by trustworthy parties, and reject any pet of an owner whom he knows, or justly fears, to be reckless or ignorant, or both.

"Verily, the business of an architect is difficult. It is exhaustive of the energies where pay, as it mostly is, is inadequate. The value of efficient and honest services is, at least, twice that of the remuneration generally here awarded. Architects do not generally appreciate the amount and gravity of the responsibilities under which their practice is carried on. Quacks defy them. The public generally is unaware of their existence, and certainly very unwilling to pay them for what, to them, has but a fractional reality, if any.

"The world, however, is moving. Let us hope and trust, and with good reason, too, that the coming generation of architects, at least,

will appreciate the full amount of its responsibility, and that its employers will knowingly be inclined and willing to justify and equitably compensate its improved services."

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

PORTICO TO THE HOUSE OF EDWARD CARRINGTON, ESQ., WILLIAMS STREET, PROVIDENCE, R. I.

[Gelatine Print, issued only with the Imperial Edition.]

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. FREDERICK C. WITHERS ("*Patmos*"), ARCHITECT, NEW YORK, N. Y.

[Issued only with the Imperial Edition.]

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. — MESSRS. VAN BRUNT & HOWE ("*Christo et Ecclesiæ*"), ARCHITECTS, KANSAS CITY, MO.

[Issued only with the Imperial Edition.]

THE essential characteristics of the design bearing this motto have been derived from the consideration of these propositions:

First. — The advance in the arts of construction enable us to build much bolder vaults than were possible in the Middle Ages, at far less expense, and with a very essential diminution of weight and thrust, by providing a rigid arched frame of iron ribs, filled-in between with porous terra-cotta or hollow bricks of fire-clay, constituting practically a light homogeneous concave shell. Thus the span of the vaults may be increased, the areas of support and the appliances to resist thrust may be decreased to an extent which invites the architect to make a material departure in these respects from the familiar types of mediæval structure, which arose from the necessity of supporting the vast weight and sustaining the complicated and sleepless thrusts of stone-vaulting.

Second. — The functions of a modern Protestant metropolitan cathedral differ so from those of the Middle Ages that, in adapting the design frankly to these new conditions of worship and ceremonial, the architect is tempted in still another direction to differentiate his plan from that magnificent collocation of nave, transepts, choir and aisles, which was illustrated by the great monuments of Paris, Amiens, Rheims, Cologne, Salisbury and York. The long perspective of narrow naves, the compact shallow transepts, the vast columns supporting the clerestories and vaults, the picturesque accumulation of chapels, confessionals, altars and screens arose from mediæval conditions, and are mediæval in historical association and ecclesiastical usage. It is true that the modern Protestant cathedral, like its prototypes, should be a monument of devotion, and, to a degree, should do its own preaching, but its relations to the new civilization also imply that it should present a vast auditorium, where the largest possible number of people can hear and see and assist in the services of the church, and where the functionaries may be accommodated with respectful regard for the order and dignity of their offices as at present constituted.

Under these circumstances the task of the architect seems to be complicated by the necessity of reconciling conflicting conditions of design. On the one hand, he is influenced by the natural desire to preserve in his new structure the august traditions of cathedral architecture; on the other, to recognize improved devices of construction and provide for the modified requirements of ceremonial worship, which, in many practical respects, may perhaps be most conveniently accommodated by a form of building rather secular than religious in its associations.

Modern English cathedral designs (notably in the late competition for the proposed cathedral at Liverpool) have aimed to meet this latter difficulty by following the suggestions of Ely and of the greater Renaissance cathedrals, and establishing a lofty dome at the crossing of nave and transepts. But this device, though eminently noble and architectural in interior and exterior effects, seems not only inadequate to meet all the requirements of space available to an audience, in the modern sense, but encumbers the floor with vast piers, entails difficult and costly construction, and, in the echoing domical expanse above, seriously compromises the most favorable conditions of acoustics.

The accompanying sketches are intended to show how all the advantage of a modern secular auditorium may be obtained without too great a departure from consecrated precedents, and at a minimum cost consistent with monumental effect, by shortening the nave within reasonable acoustic limits, and giving to the transepts far greater importance than is customary in mediæval cathedrals. The auditorium space is still further enlarged by establishing open galleries on two sides of each transept, facing the opening of the choir, and on a level continuous with the triforium of the nave.

These enlarged transepts, being furnished with apses and porches, assume the characteristics of large parish churches, of which the naves lie parallel with that of the cathedral proper. In fact, they may be used as chapels where the less important functions of the cathedral may be celebrated, while the whole space remains available for the full service. It would be practicable, and perhaps advisable, to enclose the area immediately in front of the two transept-apses with movable or permanent screens on the lines marked "A" on the general plan, thus providing smaller chapels for early morning service, or for the neighboring diocesan schools or hospitals, without essential loss of space required for the greater ceremonials.

In computing the number of chairs which may be accommodated in the areas thus established, where all may be within sound of a voice from the pulpit or lectern, it is liberal to allow seven square feet for each. This allowance includes necessary space for passages and the areas of piers. The floor area of the cathedral, including galleries, lying south of the line where the pulpit is established, amounts to 22,272 square feet. This space will accommodate 3,180 worshippers, leaving the areas of the triforium and of the enclosed chapels unoccupied. It seems safe to assume that 3,000 people may be comfortably placed within the walls so that all may see, as well as hear the preacher; of these 1,500 will be in full view of the high altar.

It has been found convenient to make the principal dimensions of the cathedral multiples of 16 feet, this being the width of the aisles: the exterior length is 330 feet; but the extreme interior width is 208 feet, and the extreme exterior width, 218 feet. The height from pavement to crown of vault is 85 feet, the method of construction making it possible to carry the point of the ceiling far above the level of the clerestory exterior cornice. The slight outward thrust of the iron roof-trusses above the vaulting is met by light flying-buttresses. The height of the tower and spire at main entrance is 325 feet; that of the four spires at the ends of the two transepts, 178 feet; that of the central copper or lead *flèche*, 242 feet.

It is not improbable that a further study of the problem of vaulting the cathedral with blocks of porous terra-cotta or hollow fire-clay, supported by an arched frame of iron ribs, would justify the application of a system of fan tracery, somewhat on the principle suggested in the roof of King's College Chapel at Cambridge, thus securing an effect of elaboration and richness far surpassing what is obtainable by following any scheme based upon structural quadripartite vaulting.

On the west, it is suggested that a garth be established by extending a continuous glazed cloister, 16 feet wide, from one bay of the choir-aisle around the enclosure, which is sufficiently open toward the south not to mask the cathedral. Against the outer walls of the cloister (which may be occupied by mural monuments and serve as a necrarium), and over them where needed, the see-house, the hospitals, schools and other ecclesiastical establishments may be built as required, and nearer to the choir should be grouped the vestries, sacristy, chapter-house and other offices connected with the immediate service of the cathedral, which is thus left clear of all encumbrances, surrounded by large, open spaces, and visible in all its parts. A minor quadrangle or close is suggested towards the north for the accommodation of the dean and canons in residence. An important point in the placing of the cathedral upon the site is to have the spire in the axis of a city street. This point is obtained in reference to One Hundred and Eleventh Street. The various approaches to the main building and its relation to the minor structures are sufficiently explained on the site-plan. But it may be advisable to state that this drawing pretends to present only a general impression of the grouping of buildings in relation to the cathedral and the neighboring streets, without committing itself to any definite project regarding the details or uses of these buildings.

The architectural character of this design has grown out of the necessities of its structure, with no preconceived intention of strictly following the precedents supplied by any particular epoch or country. But it seemed wise to draw inspiration from the earlier Christian monuments before they had, by the accidents of history, ecclesiastical and civic, developed into any kind of definite progress towards later and more sophisticated forms. From this point-of-view, the domical Romanesque seemed to offer the most promising point of departure. But this naturally develops into some form of Early Pointed when we begin to apply to it the intersection of vaults. It cannot be forced into any other direction of growth when we abandon the enormous weight of wall and piers necessitated by the stone ceilings of the eleventh and twelfth centuries in favor of the lighter structure suggested by the modern possibilities of vaulting. It would seem, therefore, that the modern architect performs a legitimate function in grafting upon the strong, healthy stock of the French Gothic of the twelfth century (that of St. Denis) the conditions imposed by the ecclesiastical requirements and constructional resources of the nineteenth. A religious monument of such enduring magnitude should stand as the highest exponent of contemporary civilization. To apply to the designing of such a monument any more fundamental process of invention, to impose upon it the personal fancies or predilections of the moment, or to affect it with prevailing fashions of design, which to-morrow may pass into oblivion, would be an act of presumption. On the other hand, a frank adjustment of ancient consecrated forms to modern conditions of structure and use must inevitably bring our monument into the line of healthy contemporary progress, and save it from the error of anachronism.

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. H. M. CONGDON ("*Christo et divitiæ in domo ejus*"), ARCHITECT, NEW YORK, N. Y.

THE design for Cathedral of St. John the Divine, which bears the above motto, is laid out on the general ground-plan of English cathedrals, having besides the main transept an eastern one.

On the east side of north and south main transepts are four apsidal chapels with their own dedication and altars for different nationalities, *viz.:* St. Boniface, German; St. Gregory, Italian; St. Remigius, French; and St. Olaf, Swedish. These have side-screens, and the whole space in front of each can be used for attendance upon celebrations in the different languages. A double porch opens into the south transept on west side, and the north transept has an octagonal porch at entrance. The large octagon at crossing gives the utmost space for a vast congregation to gather within sight and hearing of the preacher.

A lofty rood-screen marks the separation of the choir, which is of three bays, and one bay for the sanctuary, beyond the crossing of the eastern transept, all enclosed within open-work iron screens. Aisles form an ambulatory all round the choir, which seats 146 clergy and 60 choristers.

East of the choir, and separated from the ambulatory by a rood-screen, is the Lady Chapel dedicated to the Blessed Virgin, with its altar and sacristy. A porch in south aisle of choir gives access to the chapel, which can be used for early celebrations and minor holy-day services.

The interior dimensions are about the same as Lincoln Cathedral, save that the vaulting is higher and the feature of the octagon at crossing is wanting in the former. This octagon follows the ancient precedent of Ely, as well as the modern one carried out in two of the designs for the new Liverpool Cathedral.

The internal elevation of nave, transepts and choir is marked by the cathedral triple arrangement of arcade, triforium and clerestory, with large windows in the gable walls of different designs.

The whole interior is intended to have vaulting in stone, with roofs over, framed in iron and covered with copper.

All the internal walls are to be faced with stone as selected, no plaster or paint being needed. A warm, reddish buff color would be preferable, which, with red granite columns and richly-stained glass in windows, would give a warm atmosphere to the interior, which, with its architectural proportions, would have the effect aimed at in the design, *viz.:* stately, dignified and, above all religious.

The prevailing style of architecture is Early French based upon the English ground-plan, and carries out the idea of the early union of the Gallican and British Church as exemplified by the Council of Arles, at which place, also, St. Augustine was consecrated bishop, thus deriving his orders — Taro, Lyons and Ephesus — from St. John the Divine.

The position of the dome over the central crossing of nave and main transepts is further emphasized by the flanking towers terminating in slender spires, which form a contrast with its mass, and are constructionally useful in giving access to its upper part. This composition admits a claim of some originality to the design, as this feature is unusual, but also gives a graceful grouping to the mass whether viewed from the eastern or western angle of the building.

The eastern transepts are carried up to same height as choir for one bay only, and continued at a lower elevation for two bays more, thus securing a greater amount of light at east end for illuminating the sanctuary.

DIMENSIONS.

Width of nave between centre of columns	40 ft.
" " " and aisles between walls	80 "
" " crossing covered by lantern and dome	80 "
" " transepts between aisle walls	80 "
Inside length from west wall to choir-screen	232 "
" " of transepts between north and south walls	216 "
Outside diameter of western towers	28 "
" " " towers flanking dome	38 "
Width of choir between centres of columns	40 "
Length of choir from rood-screen to east wall	120 "
Width of choir aisles from wall to centres of columns	20 "
" " eastern transept between walls	30 "
Length of eastern transept between walls	164 "
Width of ambulatory	18 "
" " Lady Chapel between aisle walls	55 "
" " " " from screen to east end	76 "
Cloister, outside dimensions	90 ft. x 94 ft.
Library and chapter-room over, inside walls	30 ft. x 80 ft.
Total length of cathedral outside of walls, including Lady Chapel	472 "
Total width outside of walls of main transepts	248 "
Height to vaulting in nave, transept and choir	92 "
" " outside ridge of nave, transept and choir	120 "
" " vaulting in lantern	160 "
" of western towers to top of parapet	140 "
" " " " " " " spires	176 "
" to top of cross on dome	300 "
" " " " finial on spires flanking dome	330 "

MORTUARIES IN PARIS. — Each *arrondissement* of Paris will henceforth be provided with a mortuary depot to meet cases of which the following is a type: A man died recently in a cab, and the body, upon being brought to his furnished lodgings, was refused admittance by the proprietor. It was next conveyed to the hospital, which declined it on the ground that only living people were received. When transported to the morgue the remains were also refused, the morgue being only for the unknown dead. — *London Daily News.*

BATHS FOR THE PEOPLE.[1]



GREAT and praiseworthy as the progress has been within the last thirty or forty years of the means of cleanliness by baths of various kinds, it is not too much to say that the great mass of the laboring classes are still without these advantages. The term, "The Great Unwashed," though in a somewhat modified degree, may still be the description of the laboring classes, not only of our own country, but that of every country in Europe. In populous towns, public baths (consisting as they do of the Turkish bath, the various descriptions of shower, needle, douche, and other kinds) are for those parts of the community who are not what is termed "the laboring class."

The ordinary warm bath and the public swimming-bath are usually within the scope of the artisan, the youth, and the unmarried men of the laboring class; but it will be found on investigation that the married laborers and their families make little use of them; the reason being that the price charged, though so low, is too much for their means. The 2*d.* or less for the swimming-bath is still too much, and this bath has the disadvantage of only being used in summer, whereas, for sanitary purposes, people must be cleansed as perfectly in winter as in summer.

Now, when we consider the circumstances of the laboring class, we find that while they are children the mother can wash them at home, but as they grow up to young men and women this is not possible to be continued by themselves on account of decency; so that except the young men get a bath in a canal, stream, or other piece of water, they generally go uncleansed from year to year, until cold water over their bodies is a repulsion.

It is quite impossible to lower the prices ordinarily charged for the warm bath and the swimming-bath, without considerable loss. It may be stated generally that public baths often do not pay their expenses. What with the interest on cost of construction and the expenses of maintaining them, they seldom "pay." In Birmingham, for example, the interest on cost of construction and expenses in working amount over receipts to about a ½*d.* in the pound on the rates; and in many other large towns a similar condition of things exists. Valuable as are the results for this addition to the rates, it is not to be expected that the rate-payers will bear a further increase, to make up the loss from a further lowering of prices to meet the wants of the laboring class.

Now, while this is the case with our large and populous towns and cities, it is much worse in smaller towns and semi-populous districts all over the land, which form a much larger population in the aggregate than those towns and cities. The cost in the first instance of building baths is so great that it can rarely be undertaken, and if done by private munificence, the cost of maintenance over the receipts is so much, that when it is taken into consideration it prevents the establishment of public baths for any class whatever, so that unless a much cheaper construction of baths and less expense of maintenance be found, it seems quite unlikely that such populations will ever have the conveniences of larger towns.

The writer often had these thoughts weigh on his mind while being associated with somewhat large ironworks in a semi-populous district at Donnington, near Newport, Shropshire; but saw no chance of mending matters until the latter part of last summer, when the idea occurred to him to provide baths for his work-people, upon the plan now before this Section. But as the people do not take kindly to baths in the winter, the construction was deferred to the spring of this year, and they were ready by June 1. It must be remembered that the ordinary warm, or slipper bath, however good, is not the mode of cleansing that the laboring classes best understand, or will be persuaded to generally use; and if periodical cleansing is to be aimed at, the warm bath is not the most suitable.

Without further preface, the baths before the Section will now be described. A special point was made that everything should be done in the most complete and comfortable manner, with a minimum cost, for it is quite impossible that limited populations, without rates to draw on, can have palatial buildings. What was aimed at was completeness and efficiency, with strict economy in construction and working.

The space of ground most suitable was of irregular form — hence the peculiar shape of the plan of the building. This is only apparent on the drawing, for to the ordinary eye it is neither seen outside nor inside. It

[1] A paper read by Mr. Charles Clement Walker, F. R. A. S., at the recent Congress of the Sanitary Institute at Worcester.

is 25 feet long, the width being 18 feet 6 inches at one end, 13 feet at the other, 10 feet 3 inches high to the wall-plate, and 17 feet 9 inches to the ridge. The roof is of galvanized corrugated-iron, ceiled with deal, painted bluish white, lined with hair felt. The space is amply sufficient for six *ordinary* baths, as they will be styled in this paper, one warm bath, a drying-closet of seven horses for towels, a washing-machine, and all the apparatus for working the baths, and has a very clean, neat and comfortable appearance. The six ordinary baths, A, are arranged on one side in compartments, with doors in front. The warm bath is at B, the drying-closet is at C. The washing-machine is kept at D, and when in use is drawn out to the area E. A seat, F, is placed for persons waiting for baths, and has a board on the floor to place their feet on in case they wish to finish their dressing outside after the bath, to save time. There is a porch G, with door to prevent draught; and, as many workmen and laborers come in dirty from their work, it was found that their dirty hands soiled all they touched, so an addition has since been made to the porch, with a washing vessel and towels to wash their hands before entering the bath-house; and as their boots are often loaded with dirt, an iron grating is placed outside, level with the ground, to rub their boots on as they walk, and this, with mats inside, keep all clean.

Each bath-chamber is 8 feet long, 4 feet wide, and 7 feet 6 inches high, which gives ample room. The partitions are galvanized, corrugated-iron, stiffened at the bottom with angle-iron, the hollow spaces of corrugations between which are filled with cement to prevent accumulations of soapy dirt. The ceiling is of varnished deal, and forms the floor above, on which the tanks and pipes are placed that work the baths; and as this has a considerable weight to support, substantial wood posts are fixed, each with an iron shoe at the bottom, to prevent decay; and as decay is so common in bath-houses, no wood is allowed to come in contact with the quarried floor, which is flushed with a hose daily, the floor having a slight inclination to the channel-drain at the side, and soon dries.

Each ordinary bath is of cast-iron, 2 feet 6 inches in diameter by 8½ inches deep; the top is rounded off smooth, so that it can be sat upon; and they are set 5 inches above the floor, being found more convenient for either sitting in, or for cleaning the feet while sitting on the stool. There is a wood grating on the floor for the bare feet. These baths have twelve coats of white paint on the inside. Enamelled-iron would have been preferred, but it was found too expensive. Each compartment has hooks for clothes; and to prevent the common custom of throwing the towels on the floor, a hook is placed for them marked "Towels." And that the floor may not be made dirty by the boots being thrown anywhere, a place in a corner is marked "Boots." There is a dish for soap, and a box with two flesh-brushes and flannel. Each bath door is numbered. There is a rough glass light at the end, with sliding pane for ventilation, and a gas-jet. Over the centre of each bath is a rose above, with two chains, marked "Warm" and "Cold," for the spray. This rose has fine holes, not so large as is used for showers, for as we have to accustom the laboring class to the use of cold water, a shower from a large-holed rose is absolute horror: they cannot bear it. But with the fine spray it is absolute enjoyment, and all speak in the highest terms of how they like it. It is no small matter to teach the laboring class to love cold water. Each bath has two cocks with handles from the hot and cold water-mains, being severally marked "Hot" and "Cold." As the bathers supply themselves with water, a black line is painted on the side of the bath 3½ inches from the bottom, to show the height to fill the water. This is found to be quite enough, as the water from the spray falls into the bath. Proper directions are in the bath-room how to use the bath.

As white glazed bricks are so expensive, the walls have three coats of white paint to prevent absorption.

The bottom of the bath has a plug of 2 inches diameter. At the bottom of the recess in which it fits, a grating is fixed to prevent pieces of soap getting into the 4-inch iron main drain-pipe to which it is bolted, all joints being "faced." This pipe goes through the building, and is sealed outside; there is no smell whatever from it.

The warm or slipper bath is full-sized, of the usual kind, of enamelled tinned iron with Shanks's best fittings. The room has a chair, with wood grating and carpet. It has also a warm and cold spray.

On the floor over the baths is a hot cistern, 4 feet 6 inches, by 3 feet deep, with tubes through it heated by steam; it is covered with wood. This cistern supplies hot water to the baths, the cold-water supply being from the main. The warm spray is supplied from a cistern, 4 feet by 2 feet, by 2 feet deep, and covered with wood. Both these cisterns are encased in wood lined with dry hair-felt ½ inch thick, and it is found that they do not lose more than four or five degrees of heat during the day. The cold-spray cistern is 3 feet 3 inches by 2 feet 2 inches, by 2 feet deep, and is supplied by a pipe from the main, with a ball-cock. All the warm-water pipes for the spray are covered with felt. As there is a water-closet in an adjoining building, there has been no necessity to provide one. The total cost of the whole complete has been 220*l.*

The steam used to heat the water for the baths is the waste steam from the works adjoining, which, after having heated the boiler and cooking-apparatus of the workmen's dining-hall for 400 men, and heating the hall, makes the water 180 deg. This is in use for about eight months of the year, but during the height of summer the waste steam is turned off, as it makes the buildings too warm, and the steam direct from the boilers is then used. For these eight months the cost of heating the water is nothing, and for the remaining four months the cost of the fresh steam is but small. If the baths did not have this steam to draw upon, a separate boiler would be required; but so small a boiler would be sufficient, that an addition of 15*l.* would cover the expense. Two hundred large bath-towels are necessary for these baths, and a stock of flesh-brushes, flannels, and sundries will cost 10*l.* So that a bath-establishment, complete in itself, of this size, with washing and drying apparatus, costs 245*l.* to 250*l.*

I have tried to form an estimate of what population such baths would be sufficient for. These six are capable, without difficulty, of furnishing eighteen ordinary baths per hour. They have supplied twenty-four baths per hour, but this was found to give pressure. It will probably be found in a town, that an extra warm bath would be desirable, each bath supplying two per hour in addition to the above eighteen. I think such a bathing-establishment would supply the needs of a town of 12,000 inhabitants with ease. As all the apparatus is ample size, if more ordinary baths were wanted the addition of a few more baths of this character would be a moderate expense, as their cost is less than half of the warm or slipper bath.

After the baths were used for a month by the persons engaged at the works adjoining, and being found to be so much appreciated and enjoyed, the public were admitted on the following terms:

Ordinary bath with one large bath-towel, use of flannel and two flesh-brushes	1*d.*
Warm bath and two towels	4*d.*
Extra towel	½*d.*
Soap tablets	1*d.*

It was thought better for each person either to bring his own soap, or buy it.

The experience in the working of the baths is that five ordinary baths are used for one warm bath. The time that the ordinary bath takes is found to be twenty minutes, while half an hour is necessary for the warm bath. The next important fact is that on an average the ordinary bath consumes eight to nine gallons of water, while about forty gallons are necessary for the warm bath. So thoroughly are the bathers cleansed in the ordinary bath, that although they come very dirty from their work, the towels used for drying themselves are returned scarcely soiled.

The directions given for the use of the ordinary bath are that the bather is to fill his bath with hot and cold water, to his own liking, to the line painted on the side of the bath, and if he likes to wash his feet first, he can sit on the stool with his feet in the bath. After which he is to stand upright, pull the warm spray to wet his body all over, and use plenty of soap with the flannel, rubbing himself well, particularly the head and feet. Then use the flesh-brushes well, back and front, washing all off with the warm spray, repeating it if he likes. Then when finally cleaned all over, to pull the warm spray and wash all the soap off, and always ending with the *cold* spray, so as to obtain a good reaction, after which he dries himself with the towel, washing the flannel and brushes, and pulls the plug in the bath, rinsing it out clean for the next comer while dressing. Thus the baths work themselves. It is found that every one uses the cold spray and speaks of the enjoyment of it in the highest praise.

EXPENSES OF WORKING.

This is a matter which has been carefully considered. If these baths are in a large town, it will be found economical to have a much larger number of them, so as to make it worth while to employ a man constantly, or what is better, a man and wife as bath-keepers, the wife doing the washing and attending to the women's baths. But for a town of say 12,000 inhabitants or less, it should be arranged that the bath-keeper have some other occupation, which is his main dependence, and be paid for attending to the baths. The set of baths now described are kept by a laboring man, whose chief occupation is the charge of the workmen's dining-hall referred to; and in the time he has to spare in the morning, he fills the cisterns and heats them, which keep their heat the whole day. This does not take more than a quarter of an hour. He then washes the towels; he gives out the tickets for the money received for baths as required; and prepares a warm bath when asked for. It is found that so few come after 6.30 P. M., in the semi-populous district where they are situated, that the baths are then closed, when the attendant flushes out the whole place with a hose, and cleans up for the next day, which occupies him thirty or forty minutes. For this he is paid 4*s.* per week. This sum with the soap required for washing towels, the cost of heating the water, wear and tear of towels and brushes, is the cost of working the bath. There is a profit on the soap sold and extra towels. So moderate is the cost of construction and the expense of working, that if a person brought his own towel and soap, one halfpenny may be charged for the bath. I see no reason why these baths should not return a moderate interest on their cost, instead of being a loss, as public baths generally are. They have now been in operation nearly four months without the least hitch. Everything is so substantial and well made that very little repairs will be required. Once a year the ordinary baths will want two or three coats of enamel paint, and these are all the current expenses.

At present the baths are used only by men and boys. If women are admitted, it must be at set times when a woman will be in attendance; but for this size establishment it will not pay to have a separate set of baths for women.

THE FRENCH SLIDING RAILWAY.



Porta Maggiore del Duomo. XIII Cent., Venice.

"A RECENT copy of the *Architect* contains the following fuller description of the sliding railway than was given in the note published a fortnight since:

A description of the Chemin de Fer Glissant exhibited in the Paris Exhibition was given by Sir Douglas Galton to the British Association recently. The two principles on which the system is based are: first, to cause the carriages to slide on a thin volume of water interposed between the sledge plates or skates on which the carriages rest on the rail; and, secondly, the propulsion of the sliding trains by horizontal columns of water acting through hydrants placed at intervals on the line. The system was originally designed by Girard in 1861. Girard died in 1871, and in 1885 M. Barré purchased the drawings he had left and introduced improvements, and the line in Paris, which was 200 yards long, was on the improved system. That line simply exhibited a train which ran backwards and forwards, and showed no means for transferring a train from one line to another. The sledge was of cast-iron; the water came from cylinders placed in the carriages, where it is maintained under pressure by means of compressed-air, and is carried thence through the top of the skate, whence it passes gradually out by means of interrupted channels. The channels were arranged so as to break the force of the water and to check it, and thus, as the velocity of the water in passing out diminishes, the pressure increases, and the sledge is raised slightly off the rail, about half a millimetre, and floats on that film of water. The rails are continuous, and are made of cast-iron, with a surface the width of the skate. In order to keep the skate in position on the line, there is an angle-iron on the outer side of each skate, and there are four or six skates under the carriage, according to its length. The propelling arrangement was formed by means of hydrants placed at intervals along the centre of the line, which open under the carriages. The end of each carriage was fitted with a horizontal longitudinal turbine or arrangement of vanes, so that as soon as the carriage approached the hydrant the cock was opened, and the water was forced against the vanes and propelled forward the carriage. In order to avoid danger from frost, there was an automatic arrangement to empty the water from the box after the train had passed by. The water was used over and over again. Comparing an express train carrying 22 tons weight in passengers and luggage with the sliding railway transferring the same weight, M. Barré assumed that the latter would consume 24 kilogrammes of coal, whereas the former would consume 420 kilogrammes; that is to say, that there would be an economy in fuel of 94 per cent. The advantages claimed for the invention were that it afforded great easiness of movement; that there was an absence of noise; that the train could stop almost immediately; that it could go up any incline, and that, on a level line, a speed of 140 miles an hour could be obtained with a pressure of 22 kilogrammes in the hydrants. The material was remarkably light, and it was considered that the economy would be enormous.

Sir Frederick Bramwell said that in 1853 he saw in the United States an attempt to diminish the friction of steamboats in water by blowing a film of air between the bottom of the boat and the surface of the water. Such a boat made a journey from New Jersey to New York in connection with the ferries, and, he believed, ran several years; but it was found that the power required to provide compressed-air was just about equal to what was saved in driving the paddles, and, therefore, it was not continued. He looked upon the present invention as very interesting, and, although one never knew what might come into use, he did not think the elements of commercial use were in this sliding railway.

Professor Unwin pointed out the enormous importance of the air-friction, which overshadowed the importance of the rolling friction.

The President said this was one of those subjects about which it was only safe to prophesy after it had become an established fact. It would not be safe to say it would not succeed, but at present it did not appear to be anything more than an ingenious application of a well-known principle.

MANUFACTURE OF COW-BELLS. — There are four establishments in this country devoted exclusively to the manufacture of cow-bells, two being in Collinsville, Ill. One hundred and fifty dozen are turned out daily, and thousands of them dangle from the necks of cows all over the prairies of North and South America. The manufacture of cow-bells is entirely different from that of other bells. Instead of being moulded, the metal is rolled into sheets cut into symmetrical polygons, which, when folded, are pressed into their well-known form. After being riveted they are packed in clay and brought to a white heat. When suddenly cooled, these steel bells are found to be not only tempered, but beautifully bronzed. — *Pittsburgh Despatch.*

BOOKS & PAPERS

PROFESSOR BAKER has supplied us, just at the right time, with just the book[1] which architects and engineers have, perhaps, needed more than any other — a modern treatise on constructions of stone, brick and mortar. When we reflect upon the books to which we have hitherto had to resort for information on this subject, the English treatises, or, worse still, the American re-hashes of the English ones, with their examples drawn from engineering works executed in 1821, it is surprising that no one should have thought before of doing what Professor Baker has done; yet the invaluable "*Trautwine*," which, however, pretends to be nothing more than a condensed hand-book, is the only thing of the sort known to us. Of course, we do not wish to disparage such admirable works as Professor Lanza's "*Applied Mechanics*" or Professor Thurston's "*Materials of Engineering.*" Either of these is to the fullest extent modern, scientific and practical; but neither can, of course, treat the subject in a way to be so constantly and generally useful to the working engineer and architect as a book like the one before us, which, while it avoids, for the most part, theories and *à priori* reasoning, is filled with miscellaneous information gathered from transactions of engineering societies, technical journals, correspondence with architects and engineers, or deduced from the author's own experiments.

The book begins with an account of building stones, with the modes of testing them, and tables of the results of tests already made. It then treats in a similar manner of brick, cements and mortars, and goes on to treat of the combination of stones or bricks with cement in masonry; then of the testing and treatment of soils, pile, concrete and timber foundations, retaining-walls, tunnels, dams and culverts, and, finally, of the theory of arches, some actual specifications for masonwork being added in an appendix.

This simple and natural arrangement makes the book more interesting to practical men than it would have been if the order had been reversed, besides giving a better opportunity for illustrating the principles advanced by actual examples. Many of the latter are of special interest, as being drawn from the most noted of modern constructions — the Albany State-house, the Rookery and other lofty buildings in Chicago, the Hudson River Tunnel, and so on — and judicious comments are made upon them where there seems to be occasion. It would be hard to find anything of importance in the book to which exception could be taken, but we have succeeded in discovering a few minor points for criticism. On page 79, for instance, we read that clay, mixed with sand in small amount, "will not materially decrease" the strength of mortar made from the sand. The reason given for this rather surprising statement is that the particles of clay occupy the spaces between those of sand, and are themselves enveloped and united together by the cementing paste. With all due respect to so high an authority, we cannot quite make this statement agree with our own experience, which has taught us that, on mixing clayey sand with cement, the product will set slowly and feebly, and will never reach the hardness which it would have attained if the sand had been clean.

In discussing the theory of the resistance of pile foundations, also, there is an omission of some importance. Professor Baker remarks, with great reason, that the supporting force exerted by the frictional resistance of the earth surrounding the pile has not usually been sufficiently considered in estimating the total load which a pile is capable of sustaining, and he gives some interesting statistics of the surface-friction observed in driving in different soils; but he omits to mention the fact that where piles are to be driven in made land to a firm stratum below the filling, the surface-friction, although it presents a considerable resistance to the driving of the pile, does nothing to help the pile sustain its load, but the contrary, since the filling continues to settle for many years after it is put in, and whatever frictional action it has on the pile, after this is once driven, is downward, and, instead of helping to sustain the load, coöperates with it to force the pile downward into the bearing stratum on which it stands. That this may be a serious matter is evident. Suppose the resistance of the bearing stratum under the point of a pile to be three tons, and the frictional resistance two tons; if the pile has been driven in natural soil it will carry five tons, while if driven in filled ground, although its behavior during the driving will be exactly the same as before, its sustaining power, if the pile is cylindrical, so that the effect of friction would be the same either upward or downward, will be one ton, instead of five.

DURING the time this book[2] has been awaiting its turn for thorough examination, we have more than once included its title in the list of books on sanitary subjects sent in answer to a subscriber's request for information as to the literature touching on those deeply interesting and yet outwardly repulsive matters which are semi-concealed under such polite titles as "The Sanitary Disposal of House-wastes." This large volume is not a hand-book for architects, nor is it just the sort of book that engineers seem to delight in, but it is,

[1] "*A Treatise on Masonry Construction,*" by Ira O. Baker, C. E., Professor of Civil Engineering, University of Illinois. New York: John Wiley & Sons, 15 Astor Place. 1889.

[2] "*Sewerage and Land Drainage,*" by George E. Waring, Jr. New York: D. Van Nostrand Company; London: E. & F. N. Spon, 1889.

like most of the author's writings suited to the needs of engineer, architect and layman alike, for no one knows better than Colonel Waring how to make a technical discussion interest the largest number of readers.

Force of circumstance has often drawn Colonel Waring into the field of controversial writing, for he has been the object of a good deal of rather savage criticism and not a little unpleasant personal abuse, and yet in his rejoinders he has been able to keep his part of the discussion as far as possible removed from the distasteful personalities which only arm the generous reader on the side of the victim of vituperation, and add no real weight to the argument. The *tu quoque*, when used by him, is a keen-edged blade, not a bruising bludgeon. In one thing he is singular — the frankness with which he is willing to express a change of views and conviction, as he has more than once on important points, and in spite of having to acknowledge that certain conclusions formerly supported by fully developed lines of argument and circumstantial proof were based on really erroneous premises. For a writer, such a swallowing of one's words is not only unpleasant, but also detrimental to one's temporary worldly interests, in that it, in a measure, destroys the commercial value of the publications in which such mistaken views have been stated, for few care to buy books that are out of date and behind the times in theory and practice, and more than one writer is suspected of declining to reconstruct his conclusions, because by so doing he would not only have to make a confession personally unpleasant, but one which would cut down his income by cutting off his copyright returns on published works. Colonel Waring has been withheld by no such petty considerations from doing his duty as one of the instructors to whom the public most willingly listen.

The point upon which Colonel Waring has been most often attacked is his advocacy of the separate system of sewerage, and the reason for these attacks is his audacity in securing a patent on a complete development of one possible form of applying such a system to town sewerage, and it is largely to an historical consideration of this subject that the present work is devoted.

We never could see the propriety of these attacks, though the grounds upon which they were made are twofold: first, because the invention was not an invention but rather a rediscovery, so to call it, of a process already in successful use, and secondly, because it was an "unprofessional" thing to do. The first charge is a matter for proof, and the investigation of the authorities who issued the patent to him: it is the second charge that is incomprehensible. It has about as much sense and justice in it as to argue that, because a clergyman is a professional man he does what is unworthy of his cloth in taking out a copyright on the book which is the outcome of the trained labor of his brain. Doctors, amongst whom the matter of professional ethics is carried to the farthest point, look on the patenting of a successful prescription as something that can only be done by quacks, and many a doctor's family is worse off to-day because of this false sense of right and wrong: yet we believe it is not an uncommon thing for a surgeon to get a patent on an instrument or a mechanical appliance of his devising. In some sense Colonel Waring's action was like taking out a patent on a course of medical treatment, or a special mode of performing an operation, things which, of course, doctors in good standing do not attempt to do, but it differs from these supposed cases in implying that it would be necessary to employ certain definitely patentable mechanisms. To our minds his action was only that of a good business man who could not see that he was called upon to throw away the chances of worldly benefit because he happened to be a member of a body controlled, more or less, by a rather fantastic code of ethics. The patenting of his idea does not make it much less profitable to the world — if the jealous prejudices of his fellows will give it fair play — while it is probably much more profitable to him.

Our readers know what the Waring system consists of, that is, essentially, a system of small pipe-sewers, from which all but house-drainage is excluded, which are kept clean and wholesome by rapid automatic flushing which is provided by flush-tanks at the highest ends of the several lines composing the system. They know this and also the great success that attended the (only partial) completion of the system which was devised for the fever-stricken city of Memphis, but they can hardly know how great a range of territory and what different parts of the world have been benefited by the introduction of this system, either in its entirety or with such modifications as local circumstances required; for the patentee is a real sanitarian, and does not hesitate to abandon his own device in favor of another scheme better suited to meet the conditions. His catholicity is shown by the descriptions and illustrations in this book of the methods and devices which other engineers have adopted in attaining the same ends as himself.

The most amusing thing in the book, and it shows that official human nature is much the same all the world over, is contained in "Appendix C," where is given a verbatim report of the discussion in the Municipal Council of Paris, as to whether the understanding reached with Colonel Waring should be kept or broken.

In 1883 M. Lavoinne, Chief Engineer of the Department of Rouen, was attracted by what had been accomplished at Memphis, and through his instrumentality it was decided to allow Colonel Waring to introduce his system in one of the worst quarters (Le Marais) of Paris. An appropriation was secured for the work, and in course of time 868 metres of sewer were laid and brought into such successful operation that, in three years, only three stoppages had occurred, the causes of which are not clear, but any one who has lived in the poorer quarters of Paris and recalls the stick kept standing in the corner of the closet so that the malodorous contents of the closet-bowl might be pressed a little farther down the pipe to the vault, will readily believe that the cause of these stoppages probably lay with the people and not in the system. Although the work was in the hands of a resident engineer, Colonel Waring naturally had to give the installation considerable personal attention, and was put to much expense by two trips to Paris during progress of the work. The scheme was persistently opposed by the public engineers and by the promoters of other systems, and, as is the case of all political bodies, these objectors had their partisans in the Municipal Council, so that when the question came up for final adjustment on March 26, 1886, a very American (or rather, say, very human) piece of chicanery was played. Unfortunately, for Colonel Waring, it was discovered that the patent which he had secured in France was probably not valid, and so there was no longer question of his being able to sell the right to use his system for the sum of $60,000, as he had hoped; and at this meeting the question turned on what indemnity it was proper to make him for the service he had rendered, and the time and trouble he had wasted. The believers in the system and the friends of fair-play thought this indemnity should be $12,000, but a report was brought in recommending that only $2,000 should be paid, on the condition, too, that he should formally relinquish any claim for remuneration if the city should see fit to profit by his experiment, and thereafter introduce the system all over the city, and even this was, after discussion, disallowed. The arguments used to bring about this unrighteous decision are, in parts, worth quoting. The report recommending a payment of $2,000 contains the argument in support of its meagreness that "another consideration ought also to be taken into the account because of the benefits that have accrued to Mr. Waring in America, as well as in France, by the contribution voted by the Council for the establishment of the system." To this, a friendly member, M. Vauthier, later replied that this reminded him of "the nobleman in the comedy who does not pay his furnishers, and finds his tailor only too fortunate in being able to see clothes which he has delivered *gratis* on his noble shoulders. This is truly a method of procedure which is not worthy of the city of Paris. Still, the nobleman has the good taste not to depreciate the clothing for which he has so singularly paid. . . . In brief, the city does not wish to pay for the services rendered, unless she can pay for them in injuries. Mr. Waring has brought here an idea which has been admitted and applied by the city of Paris; it is but natural that she should refund his expenses, and shield herself from all ulterior claims by indemnifying Mr. Waring."

M. Leclerc (the mover of the Report): "Well, gentlemen, I ask you can we here take account of sentiment? What recognition do we owe to Mr. Waring, whom we have simply permitted to make a reputation?

M. Strauss: "You were not needed for that; his reputation was made long ago in America as well as in Europe."

M. Leclerc: "I know, my dear colleague, I am not unacquainted with the fact that Mr. Waring has made the experiment of his system in Memphis, but I declare emphatically that the engineers of Paris yield nothing to Mr. Waring. He, furthermore, thanks to the experiments we have permitted him to make, has obtained important orders from the city of Havre. Is not that a considerable advantage to him?"

The matter was clearly very largely decided against Colonel Waring on grounds of purely national jealousy, for later in the discussion we find welcomed with cries of "Good, good!" this summing up of the whole question: "The point is to know, under these circumstances, whether you ought to accord a subsidy, whatever be its figure, to a foreigner, when you have about you a legion of remarkable French engineers, among whom you will easily find one who can replace Mr. Waring."

Could our own politicians have protected their own friends any more successfully?

As indicated in this discussion, the Waring system, in a modified form, is being introduced in Le Havre, and the details relating to it are given at some length, just as the several applications of the system in this country at Lenox, Norfolk, Keene, Pullman, San Diego, Stamford and elsewhere are also described at length. Some of these systems were carried out under the charge of different engineers with modifications of their own, but all are in their essentials the system that owes its introduction to the author's persuasive eloquence with tongue and pen.

A very interesting chapter describes briefly the various systems of sewage disposal in use in different parts of Europe. Another deals with the house-connections, plumbing-fittings and the disposal of house-waste by sub-surface irrigation. This chapter is of the most value to architects, but the whole book is interesting reading to any man who ever gives a thought to the bearings of sanitary effort on the lengthening of his own life.

It was exceedingly amusing to encounter in the New York *Times* some time ago a review of this book, in which the reviewer gravely said it was a great pity that so agreeable a writer as the author had never found it worth while to write something in the form of a handbook on sanitation, for he was well convinced that such a book would find a ready sale. It would probably surprise this reviewer if he knew how large a sale Colonel Waring's popular treatises on sanitation had had in past years, and how large an audience for his views

he had from time to time secured through the pages of the *Century Magazine*, *Atlantic Monthly*, the technical journals and the daily press.

SOCIETIES

ARKANSAS SOCIETY OF ENGINEERS, ARCHITECTS AND SURVEYORS.

THE third annual meeting of the Arkansas Society of Engineers, Architects and Surveyors will meet at Little Rock, Ark., on the 12th, 13th and 14th of November, and you are earnestly requested to attend the meeting.

It is desired to obtain as full a representation as possible, as an endeavor will be made to induce legislation governing the status of the professions in the State.

To render the meeting pleasant and agreeable the Local Committee has gone to a great deal of trouble and expense, and promise a very enjoyable time to all attending. Among other attractions there will be visits to the works of Pulaski Gas-Light Company, the Little Rock Electric-Light Company, and the Little Rock Oil and Compress Company. A trip will also be taken over the line of the Little Rock Dummy Railway. There will also be a lecture delivered by Dr. J. C. Branner, the State Geologist, and on the evening of the 14th the Society will be tendered a grand banquet.

No expense will attend the meeting except actual living and travelling expenses, as all else has been provided for.

FRED J. H. RICKON, *Corresponding Secretary.*

TECHNISCHER VEREIN VON NEW YORK.

FOLLOWING I beg to send you a list of the newly elected Board of Officers and Trustees of "The Technical Society of New York" which, if convenient, please accept for one of the next issues of your paper:

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COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A QUESTION OF CHARGES AND PROCEDURE.

October 23, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Your impression of 12th inst., to hand to-day and note your reply to inquiry of 24th ult. *re* "charges and procedure."

Your assumption as to one set of tracings being furnished and original drawings held by the architect is correct.

The second set of tracings (on cloth), partially finished, *i. e.*, were two floor plans and front elevation for a public school building worth $10,500 and extra price charged for the work is $20.

In reference to the measurements they were taken from drawings for the entire work as shown. The building was then surveyed to ascertain the work already performed; in the manner usual for surveyors by putting into bill, etc., and priced.

As above stated the entire building amounted to $10,500: the unfinished portion to $4,344. On this latter amount was the charge of 2 per cent made. It was then discovered there were not enough funds to complete the building—only $2,200 available. Trustees requested they should be informed how far that amount would go toward completion. This necessitated a further reference to items in bill of quantities for which no charge is made.

You will observe 1½ per cent, the usual surveyors' fee, on gross amount would be $157.50 but the 2 per cent charged on $4,344 amounts to $86.88 only which seems to be a very reasonable charge under the circumstances. No charge for travelling 15 miles in the country nor any charge for stopping over night on two occasions besides the looking into how far the $2,200 would go.

Should also state the surveying was done in the most careful and scientific manner, having had five years exclusive practice at surveying alone. Besides I anticipated an action at law would be instituted by trustees against contractor and his bondsmen. Consequently I thought I would be called on the witness-stand to testify in the case, hence the care and trouble taken. Would esteem your opinion in this matter and would be glad to know experience of any of your readers who have been thus circumstanced.

Note your reference as to retention of drawings, etc., by trustees. The building will likely remain in its present unfinished state for years, and if so, think the drawings should revert to the architect and be held by him in the meantime. Yours truly, "EQUITY."

[WE should think twenty dollars a very moderate price for cloth tracings of two plans and an elevation, at working scale, for a school building of the kind, and, by the universal custom of the profession, an architect is not *bound* to furnish anything more than his original drawings, and one set of tracings, without extra pay, although blue prints which cost very little are often made as a courtesy. The survey appears to have been a much more important affair than we supposed. To make a survey minute and accurate enough to be acceptable in a court of law for determining the amount due the contractor, as well as for estimating whether a given balance would be sufficient to complete the work, is a very different thing from the approximate estimates of the value of work done to a certain date, which architects frequently make, where a twenty or twenty-five per cent margin provides amply against trivial errors, and the successive estimates correct each other. Moreover, "Equity" appears to have been an expert in such business, and therefore entitled to an expert's remuneration, which, at $86.88 would certainly be very moderate. As to the custody of the drawings, while we often have to caution our readers that they are likely to find difficulty in making a legal claim on the owner of their building for the drawings from which the building is erected, there is no question that the plans are much safer with the architect than the Trustees. The architect has all his arrangements made for indexing drawings, and keeping them with reasonable safety, while we venture to predict that if the Trustees undertake to keep them without using them, in five years every trace of them will be lost and they will have to pay some other architect to make them all over again. —EDS. AMERICAN ARCHITECT.]

FREMIET'S STATUE OF JOAN OF ARC.

PHILADELPHIA, PA., October 28, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I regret to be obliged to call your attention to the loose statement of facts in last week's part of "Equestrian Monuments." To begin, Fremiet's statue is not in the Exposition, and it is not bought yet by the city of Nancy and may not be, and it may not be bought by the city of Philadelphia either, and instead of being considered the best equestrian sculpture in the world, is pronounced an object of pity more than praise by four-fifths of the sculptors in Paris, and by the sculptor's friends as an exhausted effort of an enthusiastic delusion. While in Paris this summer I took pains to secure opinions in relation to this statue from those who saw it during the three weeks' exposure at the *Salon*.

Very truly yours, JOHN J. BOYLE.

[THE writer is gratified to find that the rather terrifying exordium of his critic has for a real foundation the error, pardonable, perhaps, in one who had not the opportunity of visiting Paris this year, of placing Fremiet's model in the Exposition instead of in the *Salon*. He did not state that the model had been bought either by Nancy or by Philadelphia, and no more did he say that it was "the best piece of equestrian sculpture in the world." Such opinion of its merits as was expressed was the individual opinion of the writer, and though it is interesting to know how "four-fifths of the sculptors in Paris" regard it, he still inclines to believe it *one* of the best pieces of equestrian sculpture in the world.]

ATTENDANCE AT THE COMING A. I. A. CONVENTION.

COLUMBUS, O., October 28, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—The first article in your issue of October 19, leads me to make a few remarks, which I hope you will publish in a prominent place, and charge me with any responsibility for offense given to any person who considers himself referred to.

I hope your estimate of the number who will be present at the Cincinnati Convention is entirely too small.

In regard to absentees being represented, I desire to say this: If any are sick or detained by affliction, or if any are not possessed of the means necessary to attend the Convention, I hope that all such may have a representation; and if they will all write letters to the proper officer, expressing their views upon any question to be considered, I have no doubt their opinions will be treated with the same respect as though they were present in person to take part in the discussion.

I will say further, that I, for one, would be glad to hear expressed there, the opinion and wishes of every architect in the country, upon every subject which may come up to be decided, but I am decidedly opposed to having persons who willingly absent themselves from the meeting represented by any means whatever.

I can think of nothing outside of the two reasons above stated which can furnish a sufficient excuse for any member of the profession being absent.

The notion that any one is detained by business engagements has no foundation in truth. All such can be there if they will take a little trouble to arrange their business beforehand, without losing anything in a business way, and all will be greatly gainers by an attendance. There is probably no client in the United States who will not respect a request to be absent from business, upon the part of his architect, during those two or three days, if the architect will

be candid enough to give the reason for his request. It is not "business" which will keep any one away. If any member of the profession was offered a fine commission if he would be in Cincinnati at that time, 999 out of every 1,000 of us would find that our business at home would not need our attention just then. Therefore, I say let us lay down our business, put aside all other engagements and be present at the Cincinnati Convention.

To send some one else as a representative, is about equal to sending somebody else to eat a dinner for us, and to ask to be represented when one wilfully makes engagements to be absent, is about equal to one who neglects all his duties in this life, wanting to dictate the design for the crowns to be worn in the New Jerusalem.

The way to do the profession good, and particularly to do ourselves good, is not to send somebody, or a letter, but to be at the meeting ourselves. Respectfully yours, J. W. Yost.

[The millennium is not yet, and Columbus is somewhat nearer Cincinnati than are New Orleans, San Francisco and Boston. Although the desirability of a full attendance is obvious, "business" will unquestionably keep at home many men whose representation by proxy would be valued at the Convention, and whose right to such representation, since it has the support of well-established precedent, should be unquestioned. — Eds. American Architect.]

NOTES AND CLIPPINGS

The Monument to William I. — In the matter of the competition for the best design of a National monument to the memory of the late Emperor William, the jury has now issued its award, which grants two first prizes and four second out of a total of 114 claimants. The competition was confined to the sculptors and architects of Germany, and the latter have borne away the palm, the two first prizes being awarded to plans in which architecture is the predominating element. It does not, however, follow, though on the whole it is probable, that the first of the prize designs will be the one ultimately selected. The most conspicuous of these, which proves to be the work of the architects who are building the new imperial house of parliament on the Königsplatz, Messrs. Rettig and Pfann, is that of a huge and ornamental structure, half temple, half cathedral, surmounted by a victory-topped dome, which would be made into a kind of pantheon for the chief unifiers of modern Germany. Under the lofty dome, and at the top of a broad flight of steps, there would stand a magnificent statue of the emperor, flanked on either side by statues of his great generals, while the pile would also contain a hall or Valhalla of German sovereigns, and be otherwise ornamented with sculptured commemoration of the course of National unity. The designers of this pantheon propose to build it on the site now occupied by the theatre and summer garden on the Königsplatz, exactly opposite the new Reichstag buildings with the victory column between and the offices of the grand general staff in view, and certainly the erection of this bold and costly scheme would make the Königsplatz a square second to few or none in Europe. Strangely enough, the decision of the jury has taken the critical public by surprise, but, on the whole, it seems to be a most commendable one. The other first prize was conferred on another Berlin architect, Schmitz by name. His design is a monument to be erected as a *carrefour* in the Thiergarten. Of the purely sculptural models, for which four second prizes were awarded, I may mention those of Herr Hildebrand, of Florence, and Professor Schilling, of Dresden, the designer of the grand National monument in the Niederwald, near Rudesheim on the Rhine. — *London Times.*

The Tower of St. Michael's, Coventry. — A curious controversy is going on in regard to the tower and spire of St. Michael's, Coventry, which, as many of our readers will be aware, has been undergoing some absolutely necessary repair and restoration under the care of Mr. J. O. Scott. It is now a question whether the tower is strong enough to make it prudent to hang again the peal of ten bells, and the evidence of the architect and the bell-founders seems conclusive that it is not. It has been suggested that the bells should be rehung to chime only, but as a member of the Restoration Committee remarked, "The people of Coventry would not care a farthing rushlight for that"; and they are right. A committee of honorary architects, consisting of Messrs. Ewan Christian, Herbert Carpenter, James Brooks, W. White, and J. P. Seddon, have reported that it would be dangerous to haug the bells unless the north and south windows of the tower, including their internal and external arches, were taken out and replaced by solid masonry, and powerful central buttresses of adequate width and projection carried up sixty feet, as far as the springing of the windows on the second story. The report concludes with an expression of opinion "that it is undesirable that the authentic design of one of the finest towers in England should be interfered with, merely for the purpose of ringing a peal of bells, the hanging of which within its walls the original designers, it is quite certain, could never have contemplated." This seems the common sense of the matter; but Mr. Christian has sprung a rider on his co-signatories dissenting from this "archæological" opinion, and bringing in the authority of Mr. Pearson to the effect that the proposed buttresses and closing up of the windows would be quite a proper course to take. This only shows what an unsafe and capricious guide Mr. Pearson is in such matters. He has been occupied at Westminster Hall in purely "archæological" erections, and now he wants to take the opposite line and entirely alter a famous tower for the sake of hanging bells there. Now if the bells were a necessity, or formed part of the design, there would be reason in this: but St. Michael's tower was not built for bells; it is a work of art, as well as of archæological interest, and to alter it to this extent for such a purpose, especially as a subscriber has promised to give half the cost of a new tower adequate for the bells, seems to us nearly if not quite inexcusable. For the present the matter is in abeyance. As our readers know, we have never supported the purely archæological view of ancient buildings; but this is a proposal to alter and certainly to some extent to deform the design of an ancient and very fine tower and spire, for the mere object of hanging bells in it. The Restoration Committee had much better build a new bell-tower, towards which they are offered material assistance, and leave the old tower unaltered. — *The Builder.*

TRADE SURVEYS

One of the incentives to extraordinary investments of capital is the abundance and cheapness of land. Another is the assurance that this abundance of cheap land will disappear after a few years. The appreciation of land in cities and suburban localities and contiguous territory during the past few years has helped to increase investments in more remote localities where returns are not likely to be realized. Thousands of persons whose favorite but costly amusement for years past has been to deal in railroad securities are now buying real estate and lands in far-off places. There are no means for arriving at any satisfactory results as to the extent of such investments, but an enormous amount of money has been distributed in the newer States through the transfer of ownership. This diversification of capital is attracting, and will continue to attract, widespread interest, because it is apparent that land in America is destined to rise in value not slowly, but rapidly. The causes which revolutionized ownership in former periods of commercial depression through the mediumship of sheriffs and law-courts are not acting now, and cannot. The reasons are too evident for detailed enumeration. Among them are the decentralization of industries, the establishment of banking facilities in isolated places, the utilization of raw material on a large scale — such as lumber, petroleum, coal, iron, ore, etc. — and the general balancing of the country's capacities and activities. These and some other less apparent but equally potent causes have been diverting capital and enterprise from one unsatisfactory line of investment into another and more valuable and permanent one. This policy of land-buying is intended by most investors to be productive of good annual incomes in after years, but the causes invisible just now will lead to a breaking up of these and all large holdings, notwithstanding the fears of theorists to the contrary. This fact and tendency is referred to to show that while land-purchasing is right and profitable, it cannot yield land-buyers and their heirs an assured income, for fortunes in land, as well as fortunes in money, will take wings and fly. The present rush after land is simply the preparatory step for a more general outgo from Eastern relatively over-populated sections. The success of new industries is being accompanied with the successful development of new commercial centres, and must result in as complete a commercial decentralization, so far as Atlantic coast commercial centres are concerned, as has been accomplished in manufacturing. Little types of New York, Philadelphia, Pittsburgh, and Chicago are rising in the woods of the South and the prairies of the West, and all the economic agencies at work are pointing in that direction. Last week, 76,000 tons of freight were shipped eastward from Chicago on the trunk lines, as against 46,000 tons for same week last year. This is a fair sample of commercial activity throughout the country. Railroad earnings improve, but the recuperation from the effects of 25,000 miles more of road than the country needed is necessarily slow. The great industries prosper in every fibre. The iron and steel makers are counting whether their pig-iron supply will fail them. Railroad-builders who wanted two hundred thousand tons of steel rails have been frightened at the $3 advance, and are waiting.

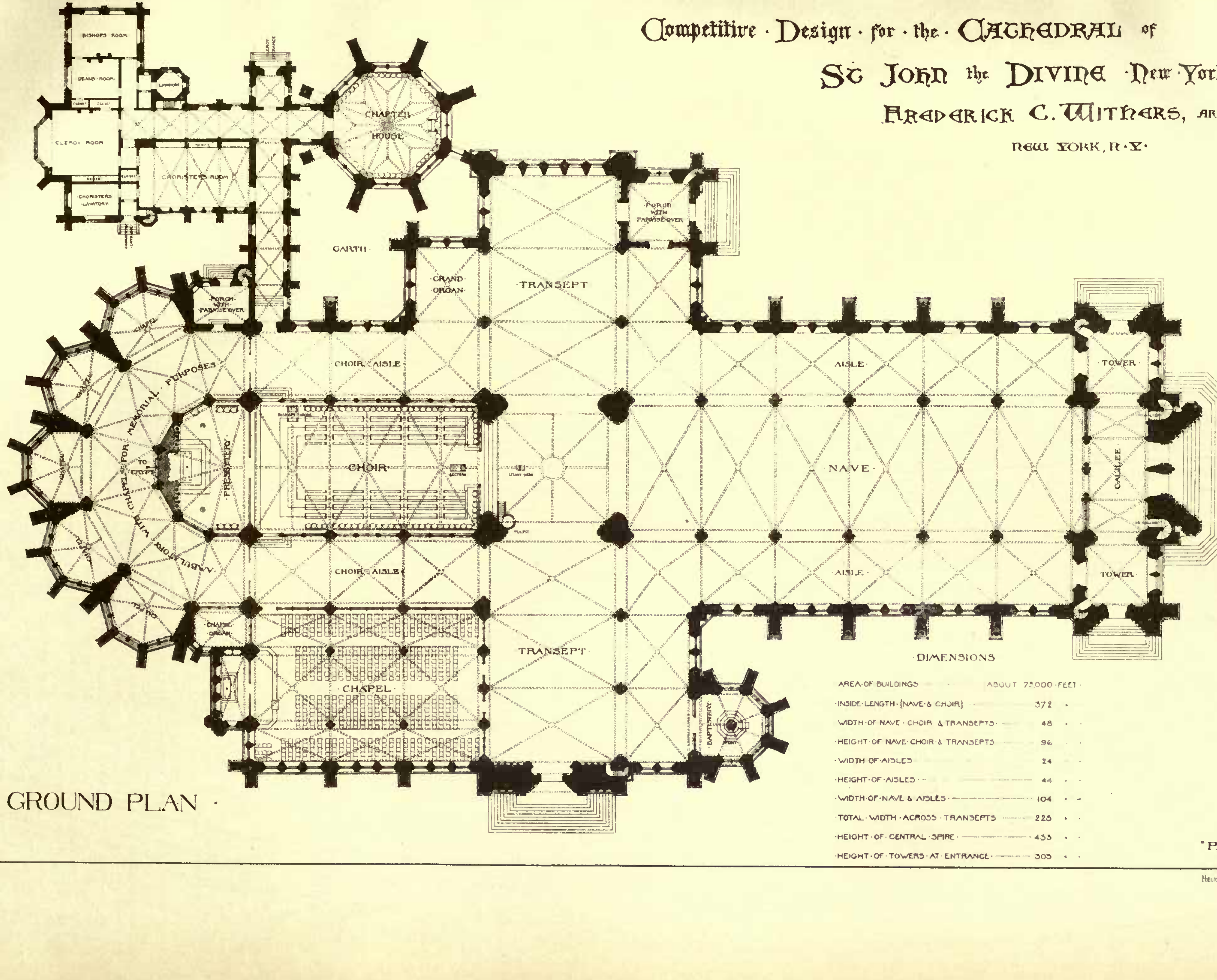
Buyers of steel are slowing up a little to calculate the chances of contracting for crude steel at two or three dollars per ton less after the present rush is over. Lumber manufacturers are preparing for a winter of even greater activity, presumably for good reasons apparent to them. The small and great hardware manufacturers have not for many years had such a season of activity. Structural iron-makers will run day and night until next summer before work in sight is taken care of. Electrical machinery requirements are compelling manufacturers to make extensive additions to capacity in all the Northern States, and inquiries are more numerous at this time for equipments and motive-power than since electricity was used for such purposes. The barb-wire manufacturers expect to form a combination to protect their mutual interests against destructive competition. Machinery, pump, tool and engine-makers have, during the month of October, added, it is estimated by some reputable authorities, enough work to engage their present force for from two to three months. All the reports received show healthy activity and competition under control. Commercial authorities say that most of the failures currently reported are due to the crowding-in of competition with insufficient capital. Money-lending interests state that while the volume of obligations are increasing, most of them relate to new or incoming business, and that less money per thousand dollars is now borrowed to tide business men over settlements than ever in the history of banking; that is, the bulk of money loaned goes into the prosecution of new enterprises and effecting the exchanges which new work makes necessary: no matter what interest is summoned into court, the same testimony is given. Little shopmen are crowded. The New England industries are busily engaged. The paper-makers report orders ahead; boot and shoe makers report expanding demand. House-builders here and elsewhere are not ready for winter. Builders in nearly every city and considerable town unite, so far as heard from, in saying that house-buying and lot-buying has absorbed more of wage-workers' earnings than in any former year. There is also a wonderful expansion of building and loan associations, and in the number of local saving banks. Yet, while these evidences of health are abundant and encouraging, the more sombre side of the picture should not be overlooked. There are too many workers scattered over the country without any reserve. High-priced stores, rigid rules and oppressive employers do injustice to tens of thousands in coal, iron, lumber and in agricultural employments. The spirit of justice and fair-dealing never grew more rapidly than now, but there remains much to do in broadening humanitarian sentiments. Justice to labor does more to disarm it of hostility to employers' interests than legislation. The improving industrial conditions are leading here and there to agitations for better compensation, and it is probable that demands of this character will become more or less general should present activity exist on the opening of the spring season.

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Frederick C. Withers, Architect.

New York, N·Y·



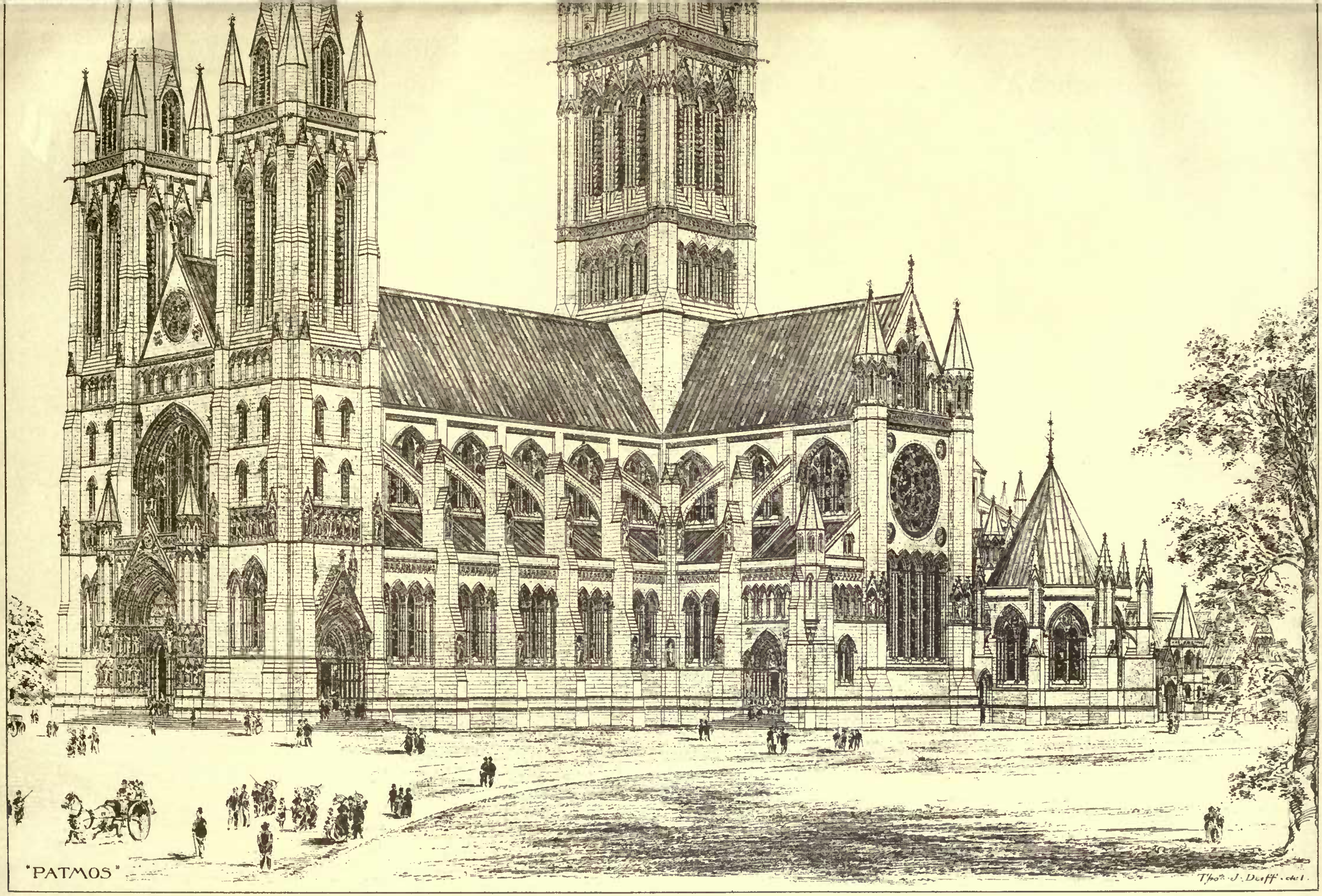
· GROUND PLAN ·

· DIMENSIONS ·

AREA OF BUILDINGS	ABOUT 75000 FEET
INSIDE LENGTH (NAVE & CHOIR)	372 "
WIDTH OF NAVE CHOIR & TRANSEPTS	48 "
HEIGHT OF NAVE CHOIR & TRANSEPTS	96 "
WIDTH OF AISLES	24 "
HEIGHT OF AISLES	44 "
WIDTH OF NAVE & AISLES	104 "
TOTAL WIDTH ACROSS TRANSEPTS	225 "
HEIGHT OF CENTRAL SPIRE	433 "
HEIGHT OF TOWERS AT ENTRANCE	305 "

"PATMOS"

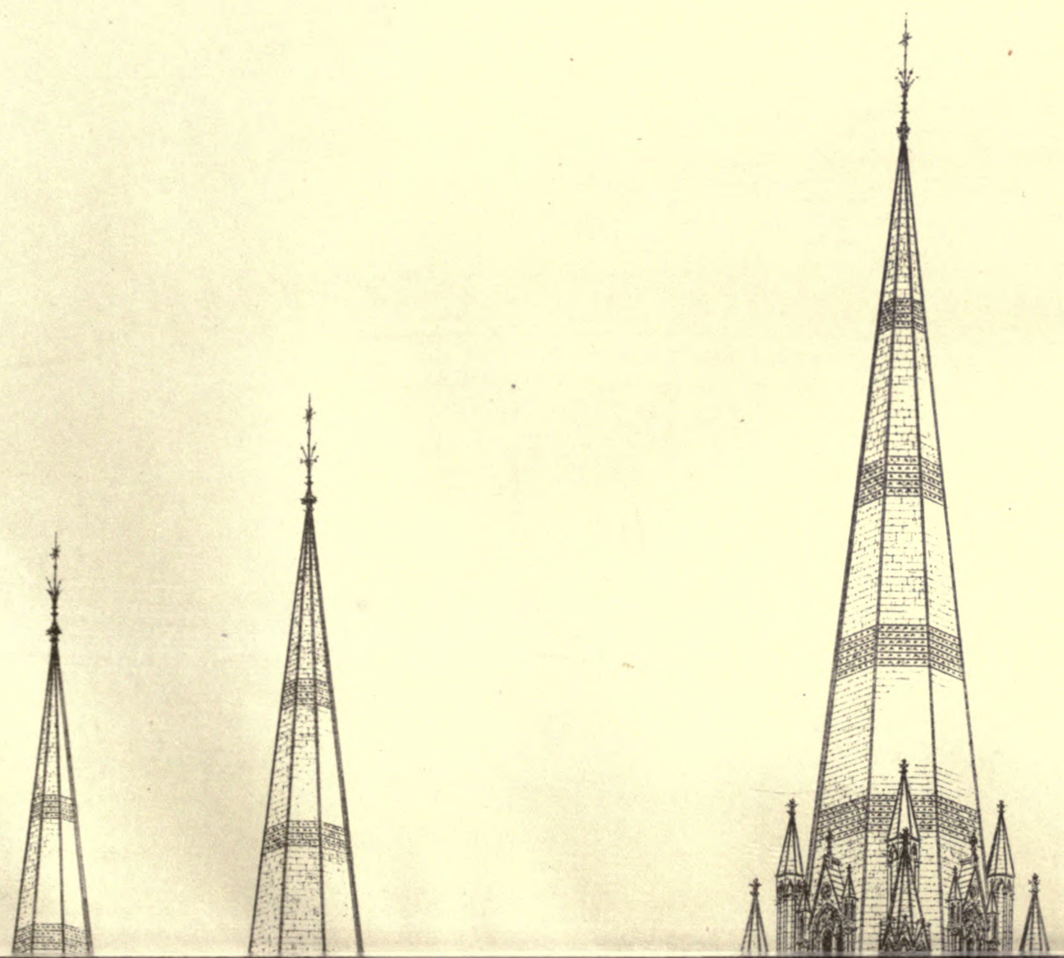
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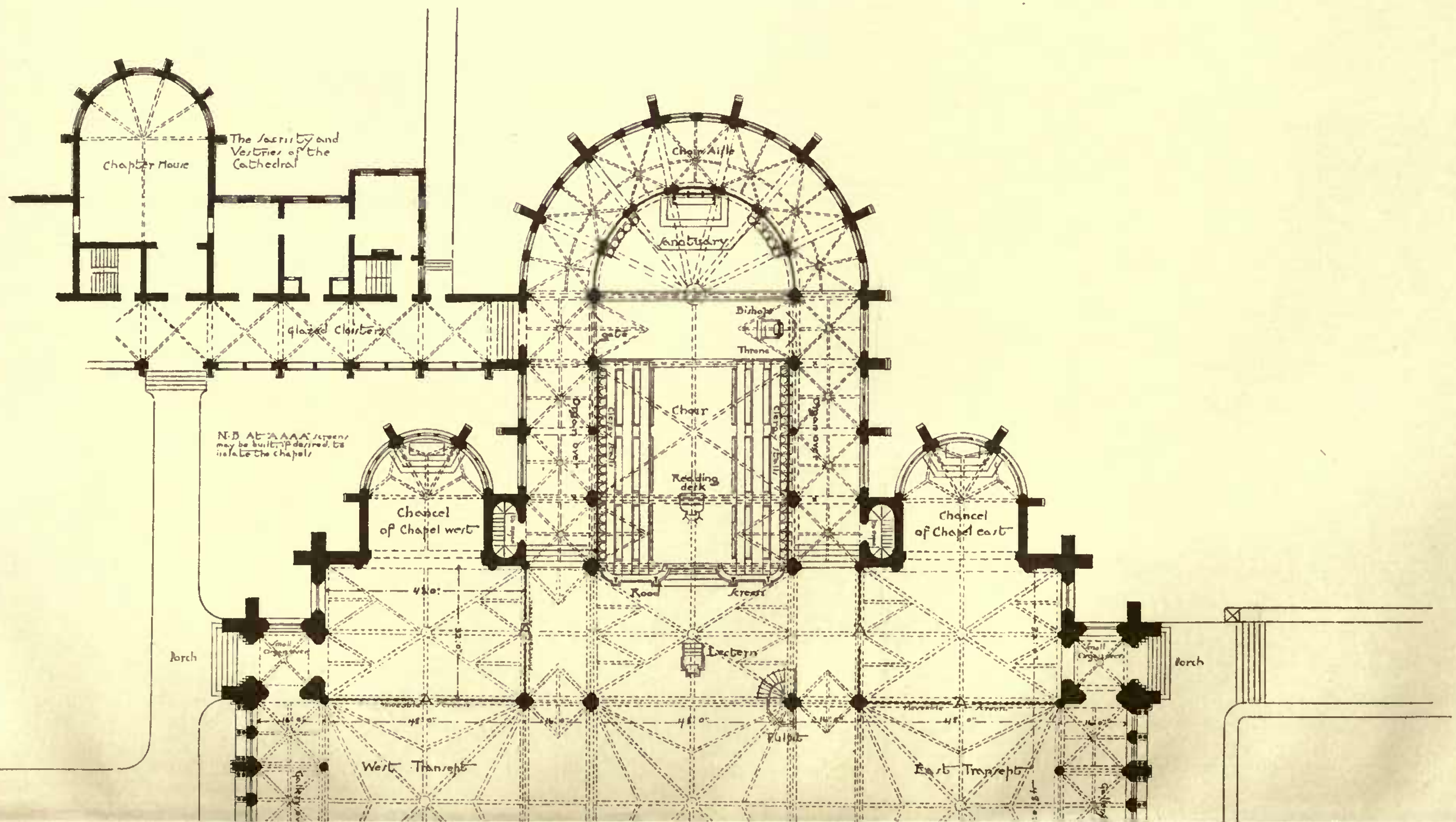
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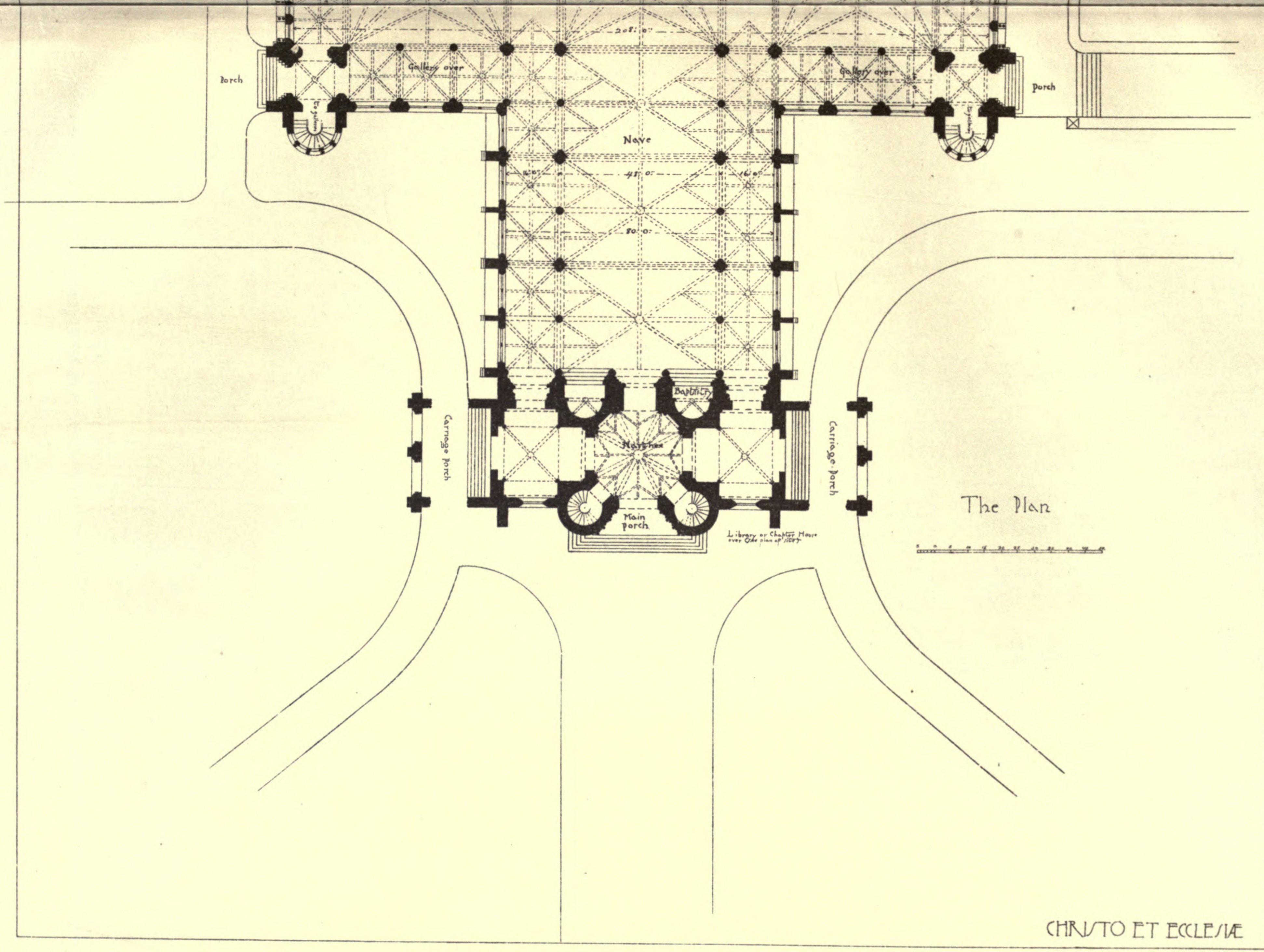
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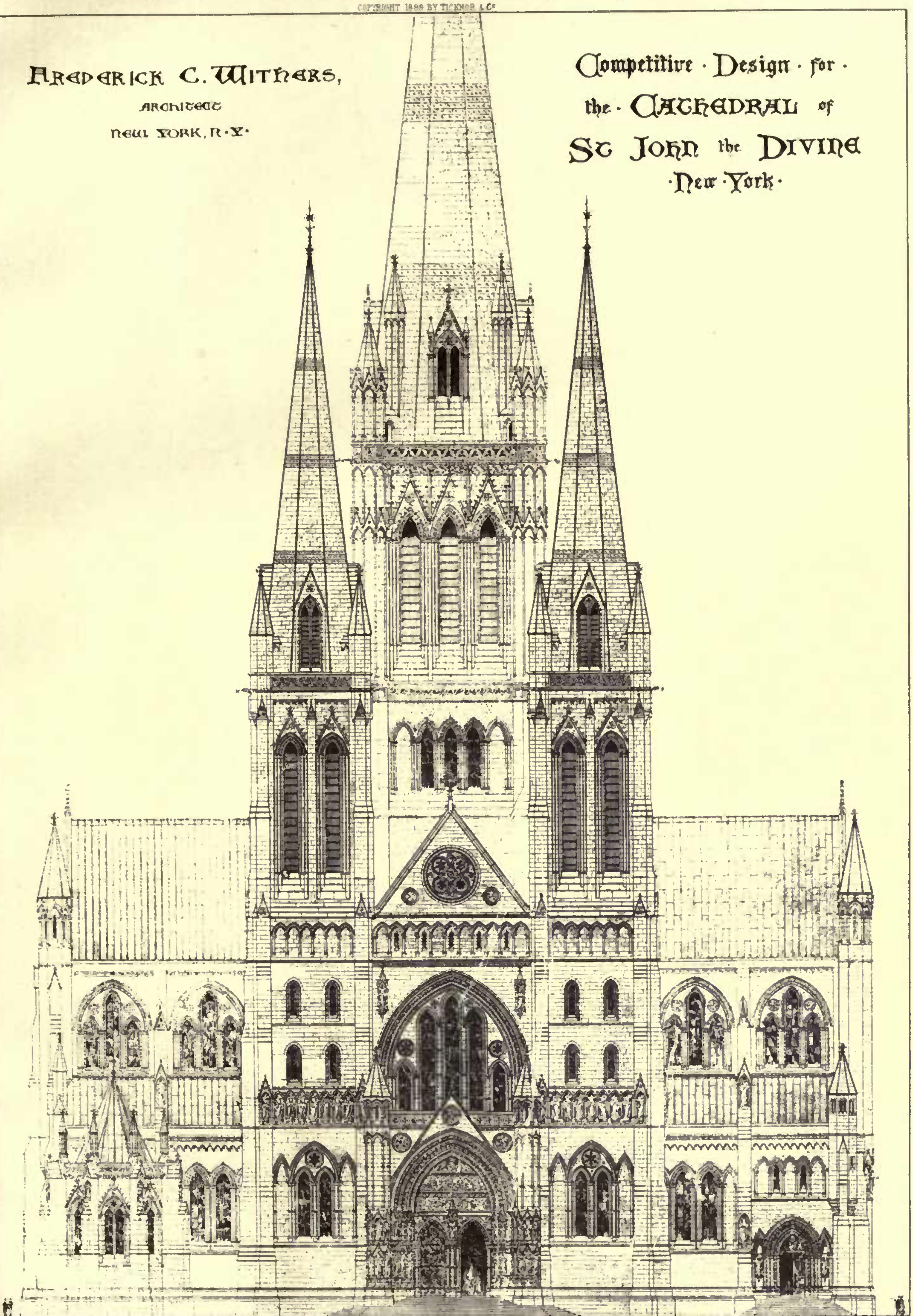




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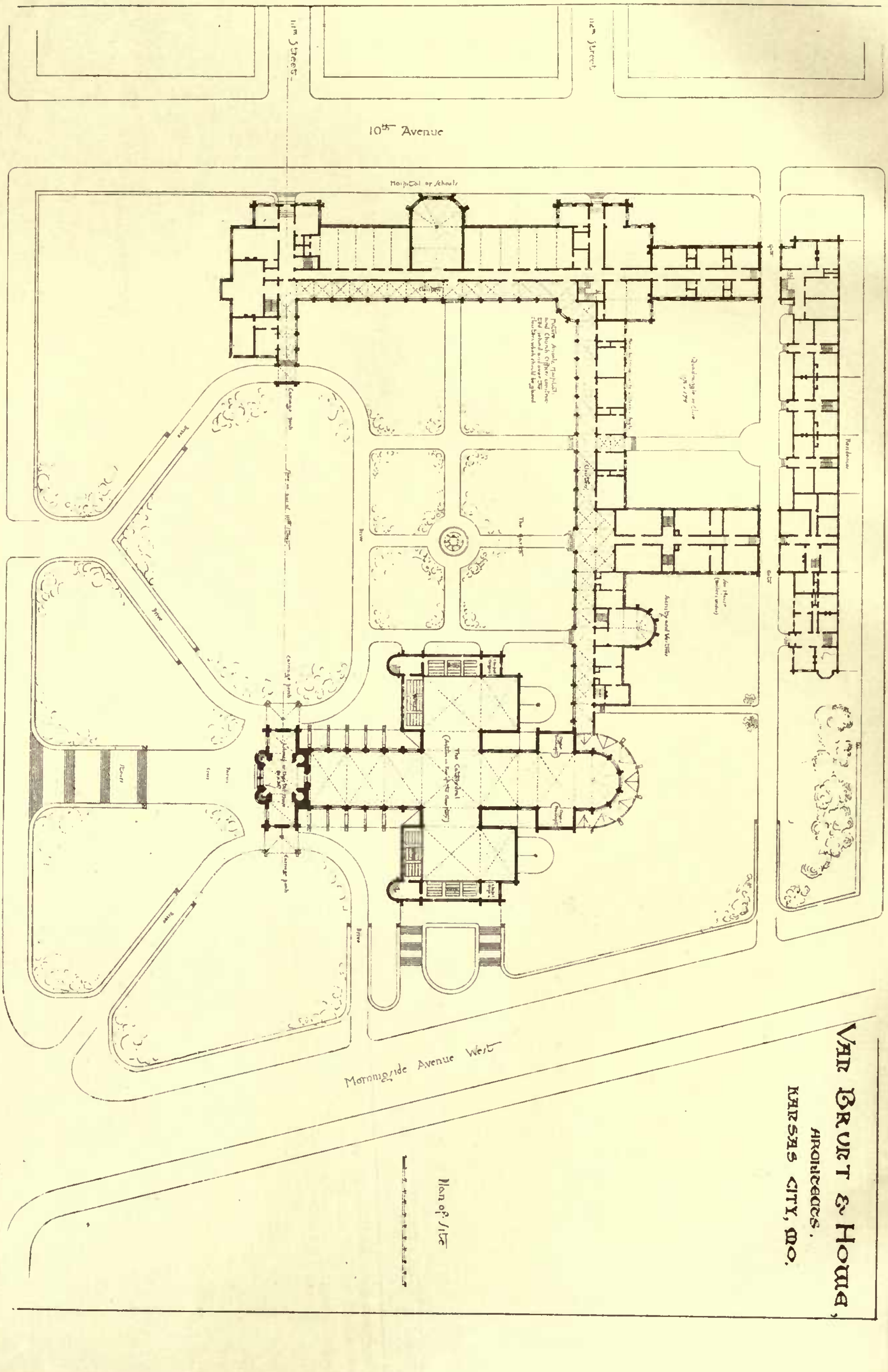
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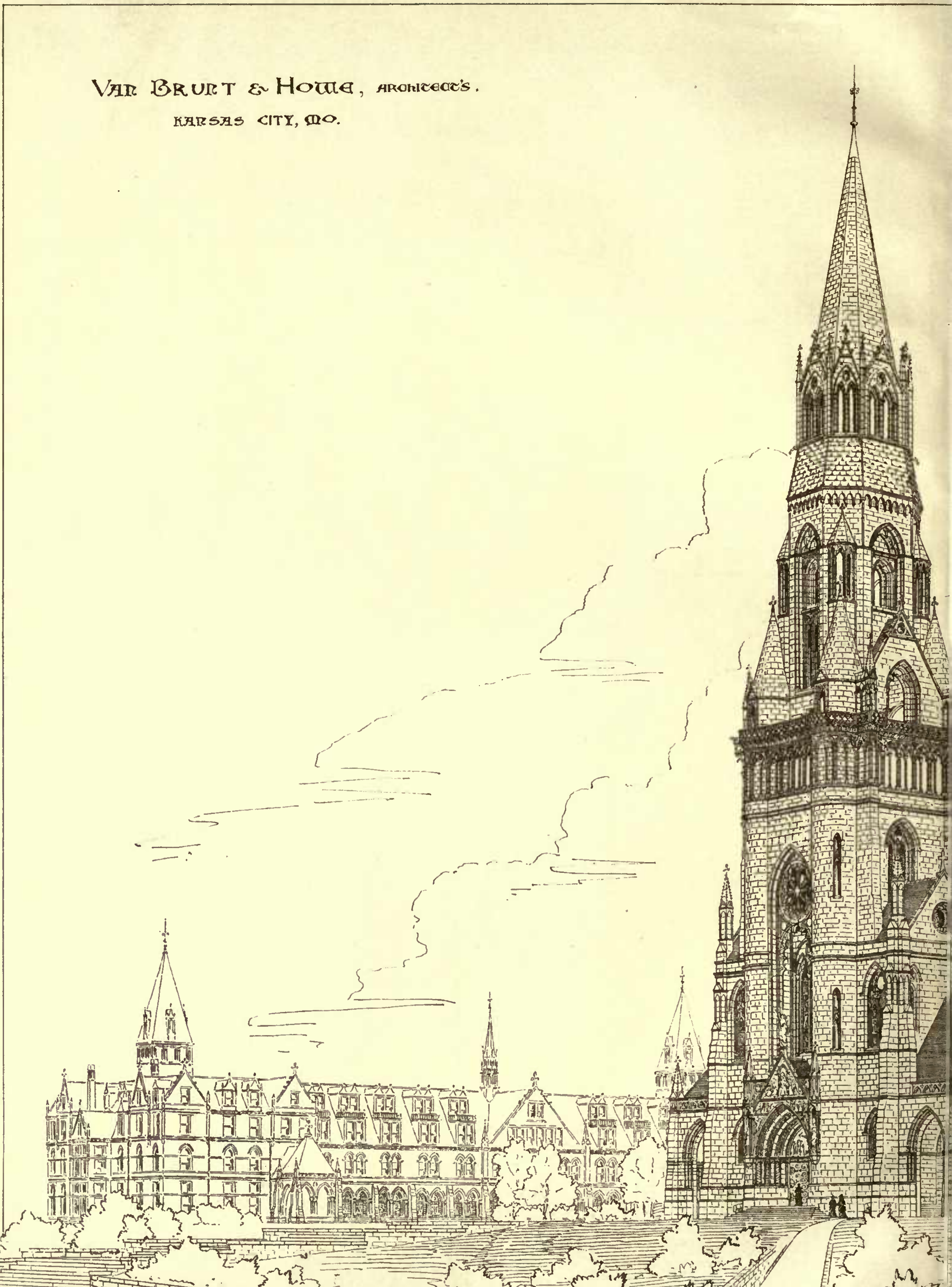
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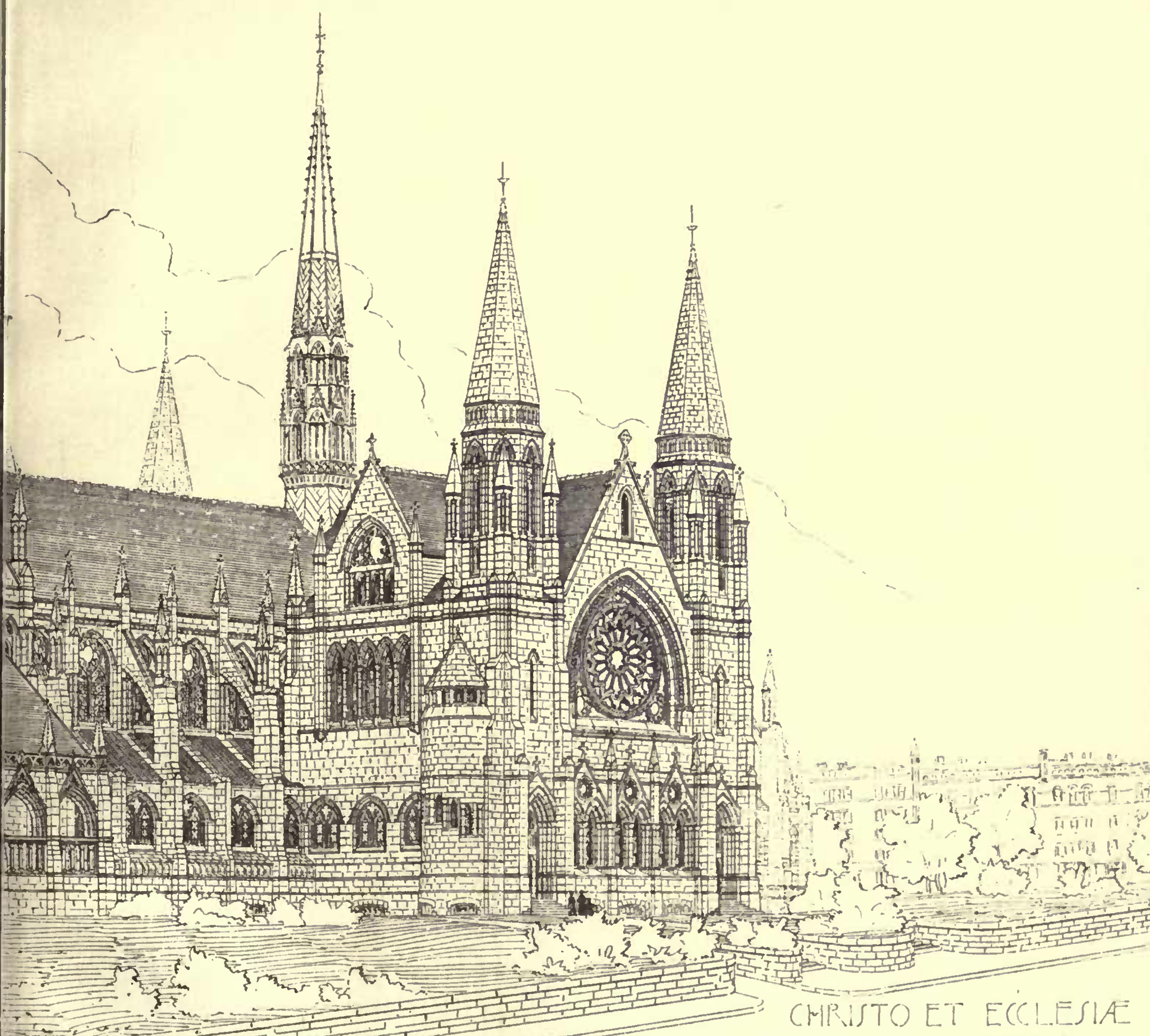
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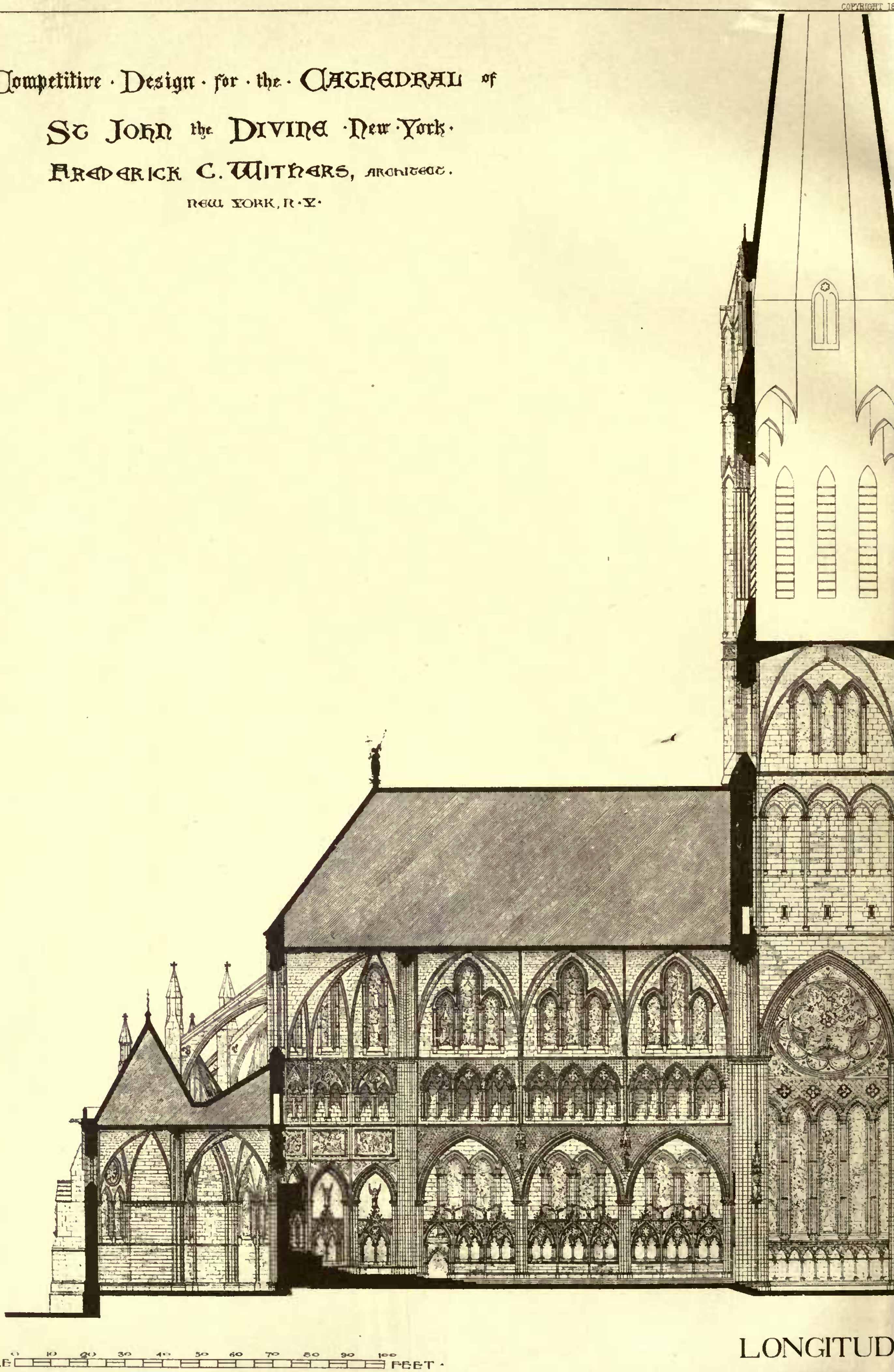
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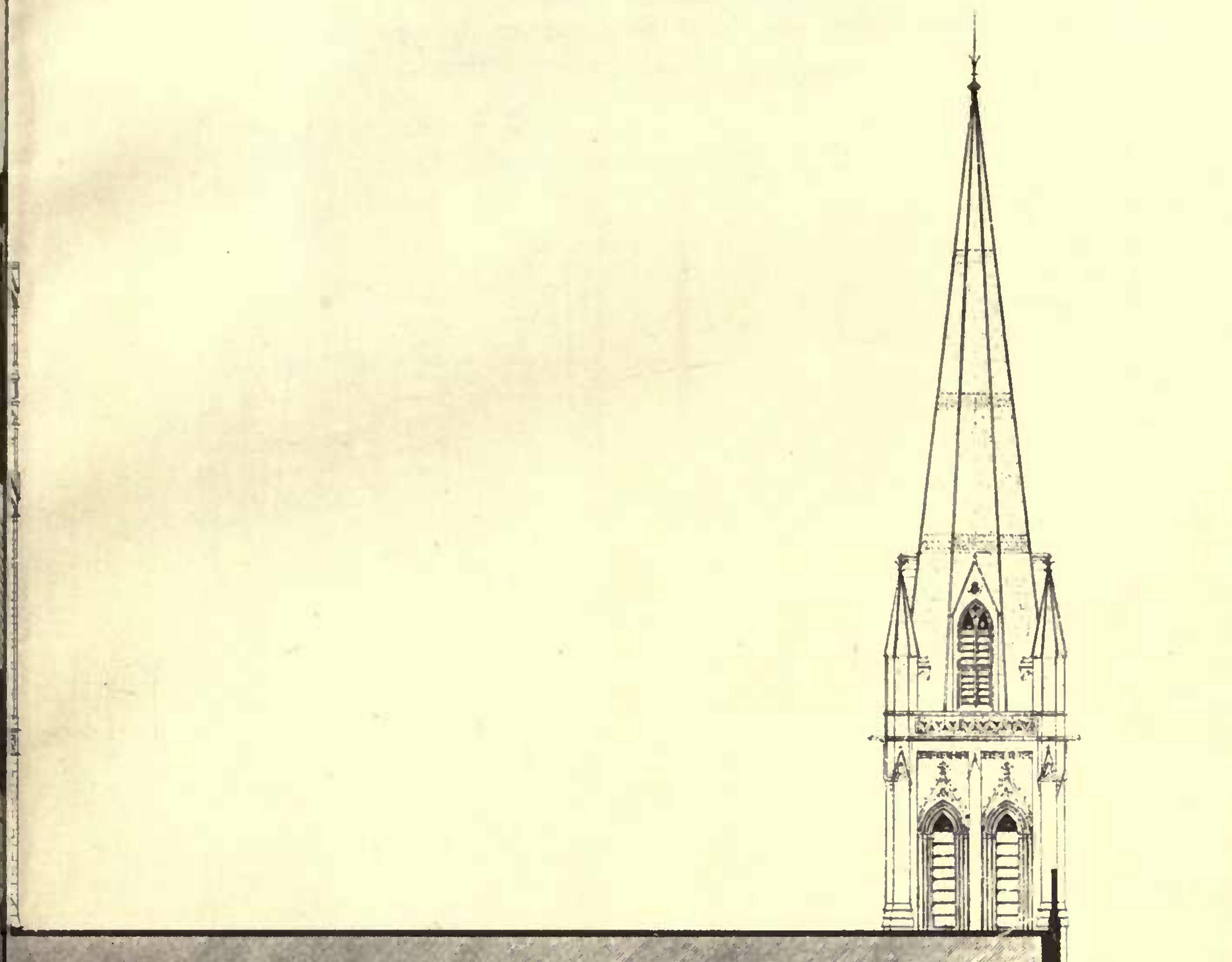
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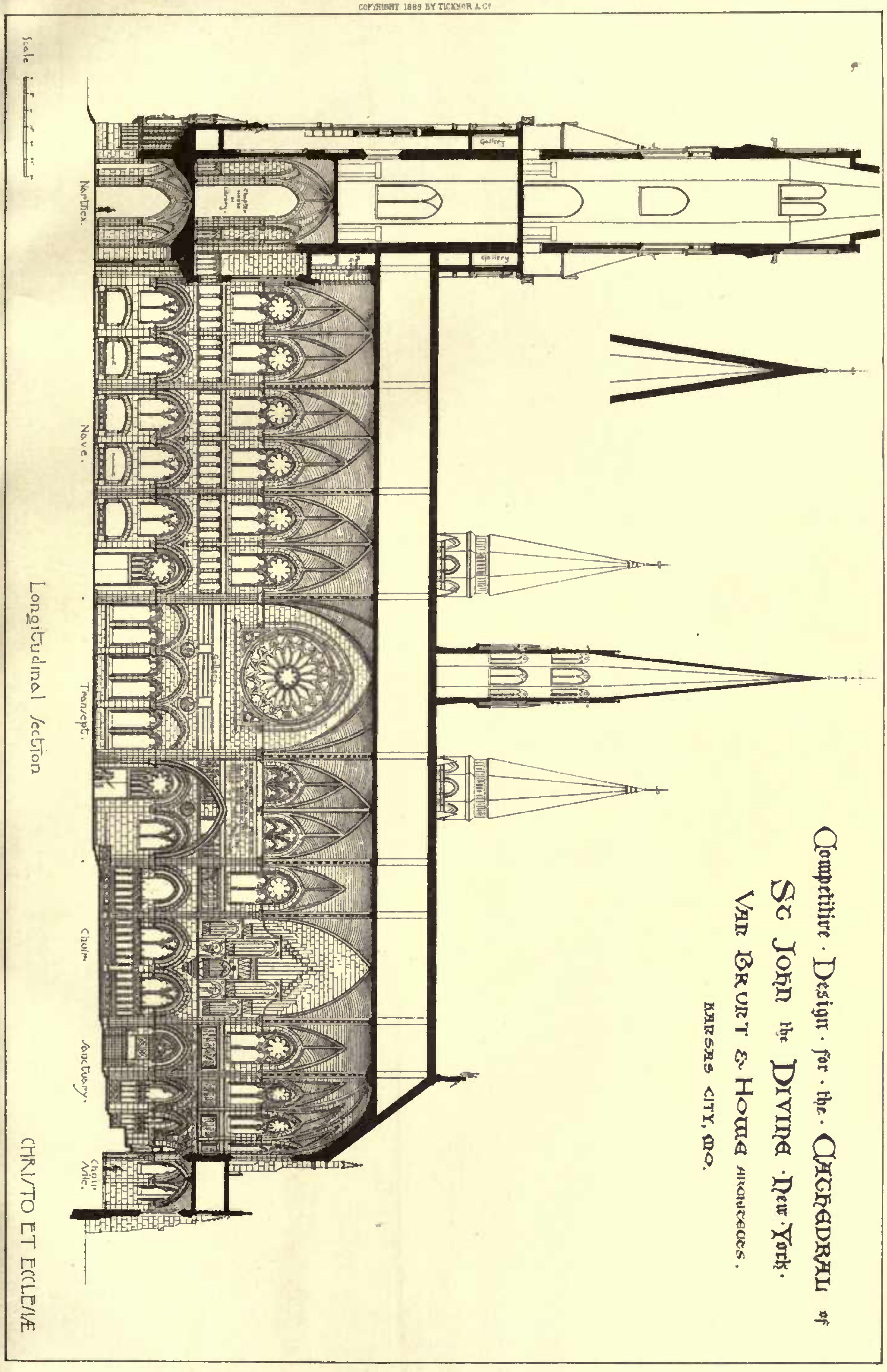
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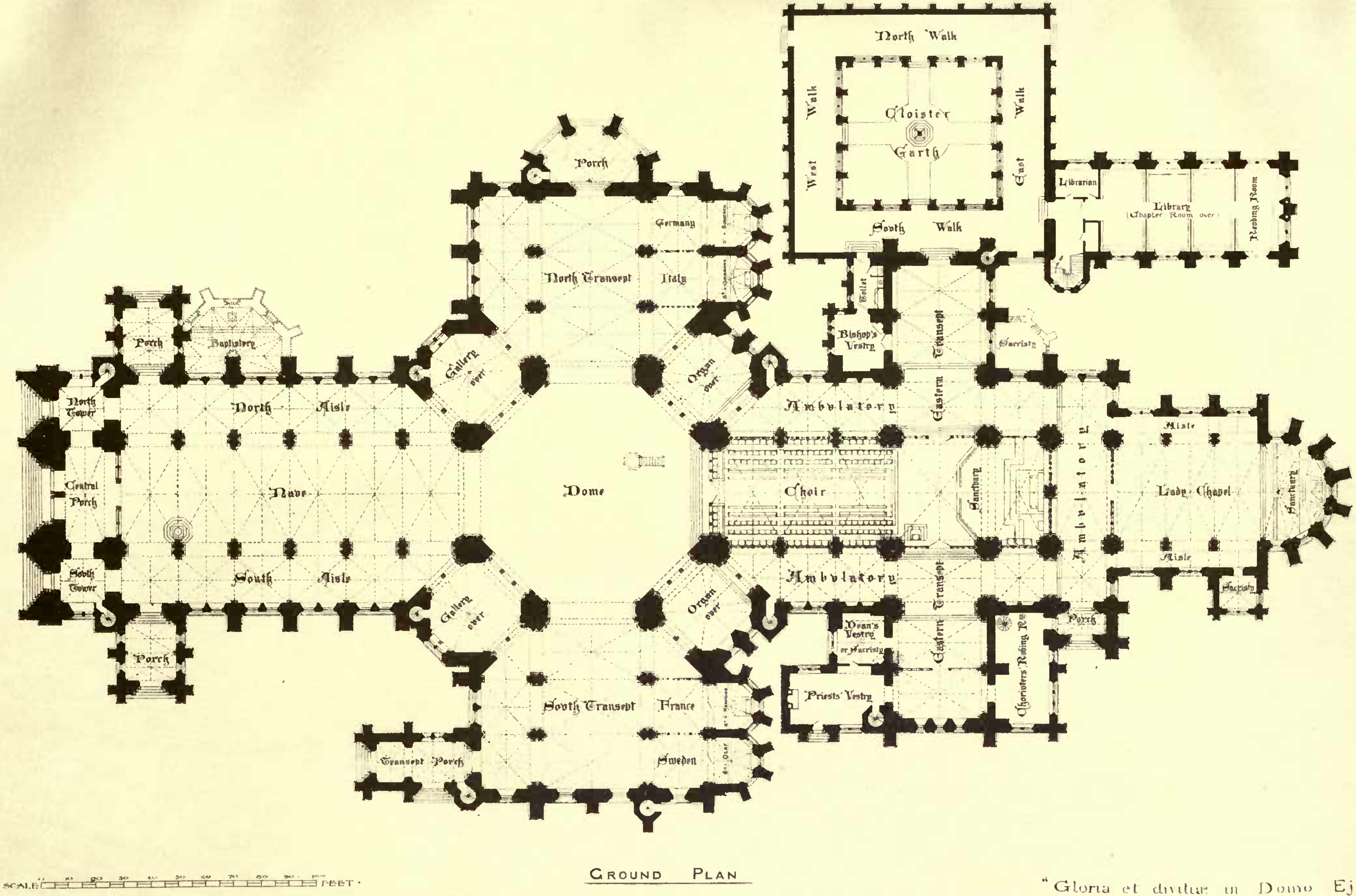


AL SECTION ·

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Scale
Narthex.
Gallery
Gallery
Nave.
Transept.
Choir
Sanctuary.
Choir Aisle.
Longitudinal Section
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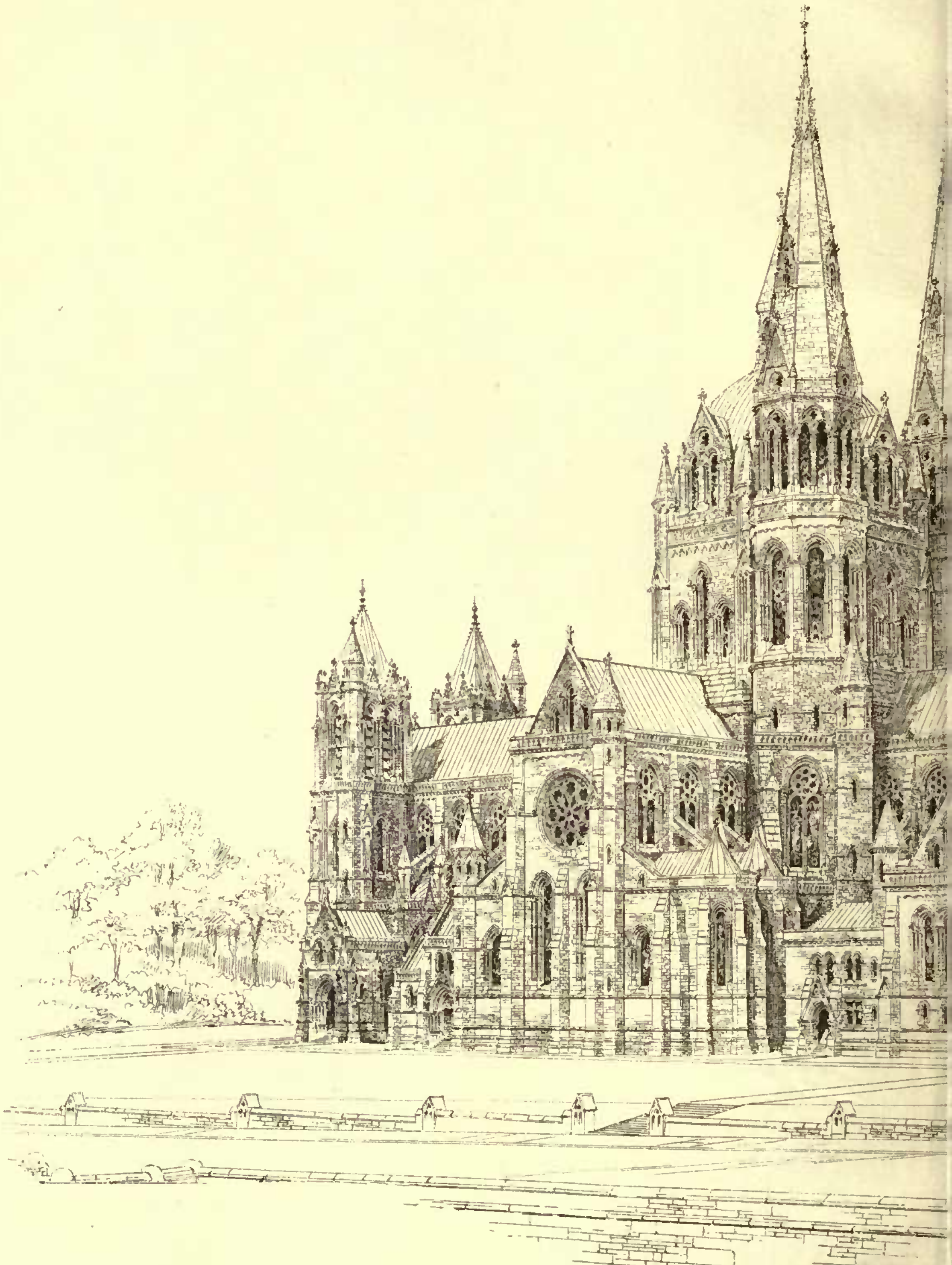


GROUND PLAN

"Gloria et divitiae in Domo Ejus"

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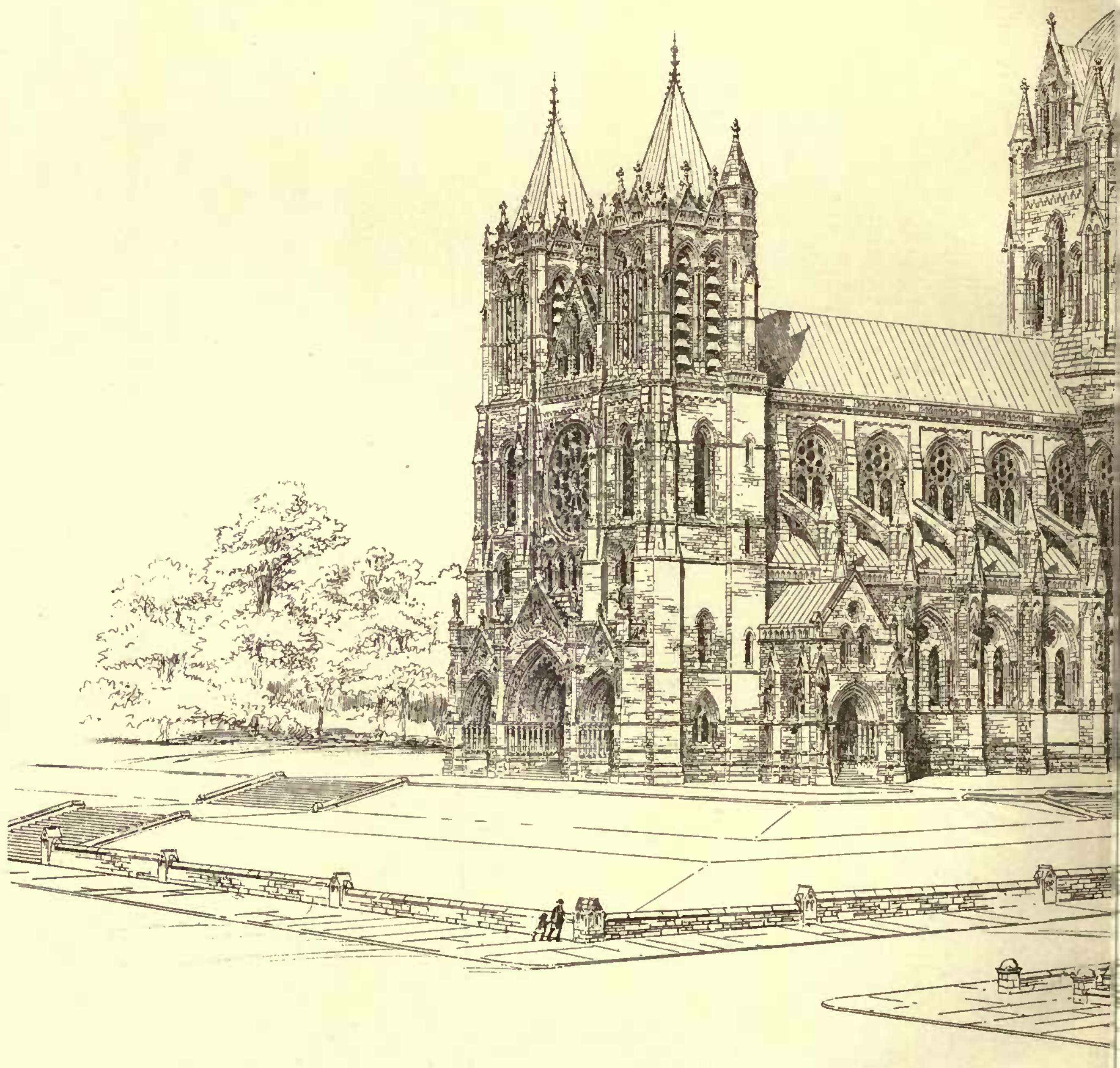
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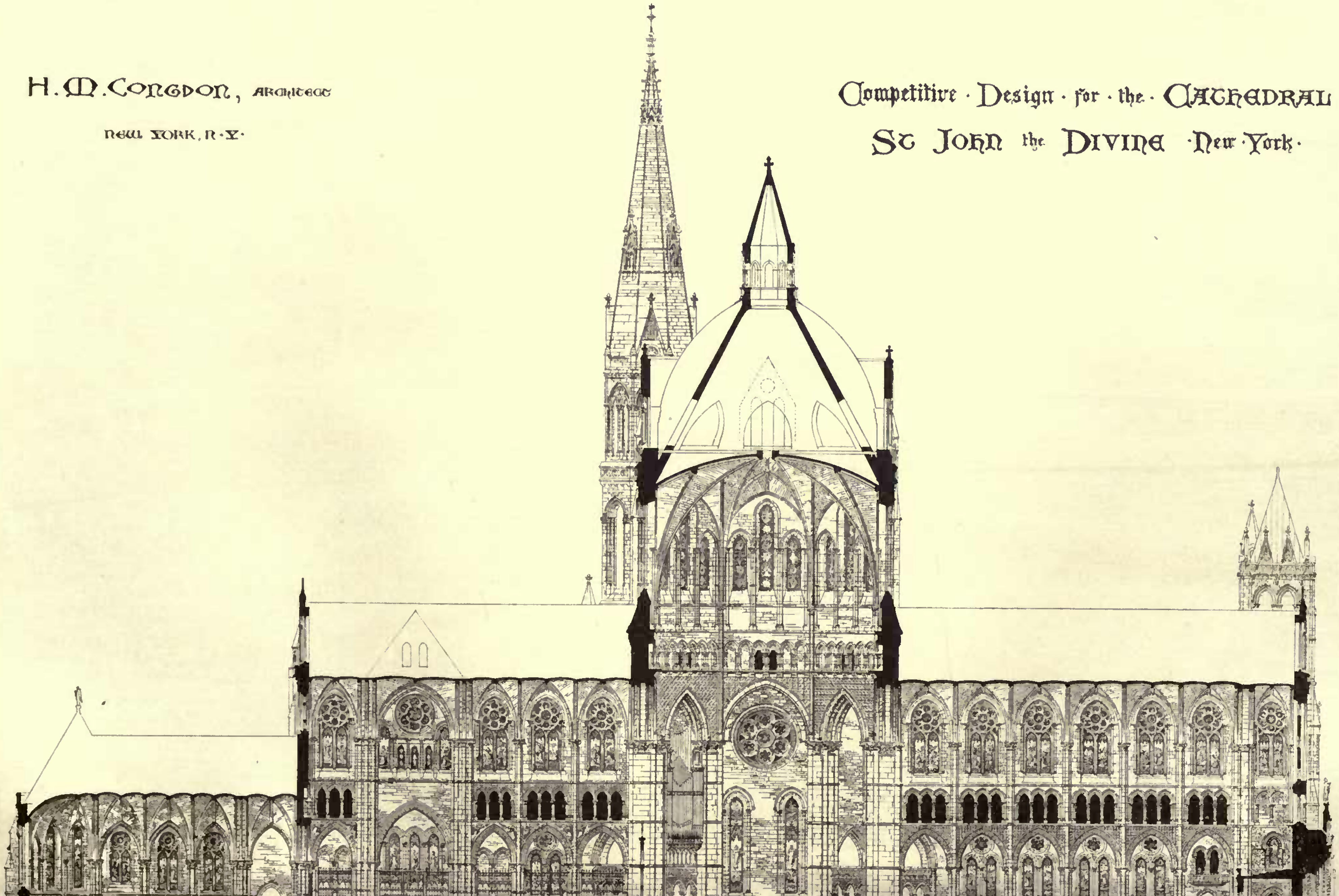
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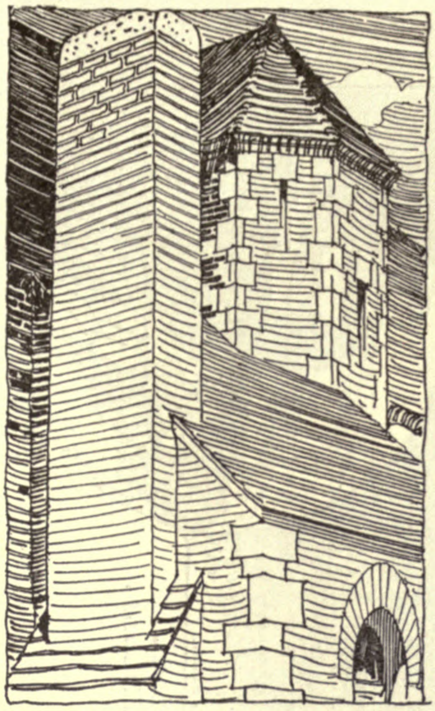
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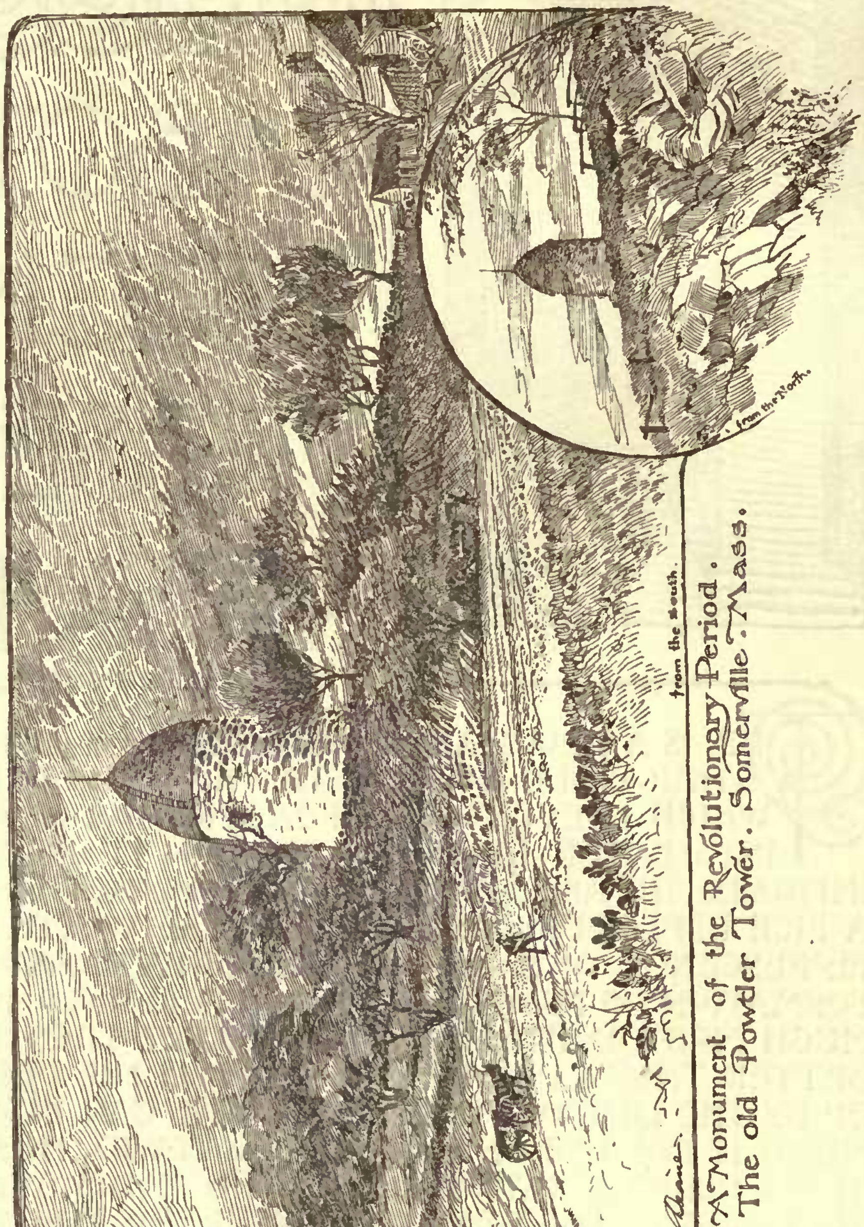
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A Monument of the Revolutionary Period.
The old Powder Tower. Somerville, Mass.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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NOVEMBER 9, 1889.

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FOR a good many years it has been our practice at this season of the year to announce our willingness to give to new subscribers for the following year the issues of this journal for the balance of the current year without further charge. This was satisfactory enough to such new subscribers but it had an unpleasant side to it, for the practice seemed to discriminate against our old subscribers who might, perhaps, feel that if any were to be favored with a fourteen months' subscription for a single payment it should be old friends, and not new ones. This has led us to discontinue the practice for this year, and to substitute for it a largess which might benefit all alike. The form we have selected is a photogravure of Axel F. Haig's extremely satisfying architectural etching, "St. George's Fountain, Lubeck," the original copies of which now sell in the market for one hundred and twenty-five dollars. As the term "photogravure" has of late been somewhat misused in America, we must explain that we do not mean a gelatine print, which by some Americans is called by that name, but a copper-plate etching produced by the same process which has made Goupil's photogravures rank so high in the scale of black-and-white reproductions. The work of this plate measures ten by fifteen inches, and it is printed on heavy plate-paper twenty-two by twenty-eight inches, and we can assure our subscribers that both in size and quality the print will be found one that they will gladly provide a frame for. To all prepaying subscribers to the Imperial edition, whether old or new, who make their subscription direct with us this print will be sent without extra charge. Subscribers to the Regular edition who make their subscription direct with us can obtain the print by adding fifty cents to their remittance for a full yearly subscription. Those subscribers to either edition who find it more convenient to obtain this journal through other channels will receive the print on making application to us accompanied with one dollar, while to any one who is not an annual subscriber we will willingly forward the print on receiving the retail price, three dollars. It may be well to take advantage of this opportunity to say to the subscribers to the Regular edition that the fact that there is no margin of profit on what we give in return for their payments prevents our treating them in this case on the same plane with the Imperialists, and also makes it impossible to add the occasional "extras" we would like to bestow on them. At the same time, they should bear in mind that they reap a direct benefit from the fact that all that is published in the Regular is also published in the Imperial edition, and as it is our constant care to keep this at as high a level of excellence as the subscription rate requires, the portion of the journal that is common to both is really better in grade and quality than it could be if we had only the lesser subscription rate for dependence.

WE were very glad to receive Mr. Yost's letter, published in our last issue, as we always are to get any expression of opinion from architects about Convention matters, and, without applying our remarks particularly to him, we will utilize his letter as a text for a more extended comment on the general subject than we could spare room for when the letter was received. In the first place, as to the proportion between the probable attendance and the total membership of the profession in the country, we think that, in placing the number of architects likely to go to the Convention at a hundredth part of all those in the country, we set it too high, rather than too low. At present, we suppose the number of persons in the United States and Canada who are, or pretend to be, architects, is not very far from seven thousand. A hundredth part of this would be seventy, and, after many years of experience of conventions, we do not remember ever seeing half that number present at any business meeting. Occasionally, thirty or forty men can be collected for the closing festivity, but at the meetings where the destinies of the profession are settled, we have, at least in the Institute Conventions, rarely seen, at any given time, more than fifteen or twenty persons who, under the regulations in force for the government of conventions, were entitled to vote. It is very likely that on the present occasion, which is a particularly interesting one, a large part of the Ohio members of the Institute and the Western Association will take pains to attend, and as Chicago is only half a day's journey away, and contains a great number of enthusiastic and public-spirited architects, while Indianapolis and Louisville are still nearer, it is probable that many will come from those cities, perhaps enough to make up an attendance of seventy-five or a hundred; but the very circumstance that Cincinnati is such a convenient place of meeting for so large a professional population will, we know, keep the Eastern men away. We do not think that it ought to keep them away: on the contrary, we should be glad to see them muster up their courage and go to Cincinnati in a body; but, as a matter of fact, the few of them who can afford to spend a hundred dollars and a week's time, in attending the Convention, will say, and do already say, that the Cincinnati and Chicago and Cleveland and Indianapolis men are quite intelligent and energetic enough to be trusted to take charge of the welfare of the profession, and that if the Eastern members had any interests differing from those of the Westerners, which there is not the remotest reason for supposing, the latter would be in such an overwhelming majority that the Eastern men might as well not trouble themselves to go and vote at all. Now, although the Eastern members are perfectly amiable in making this argument, and are, we think, almost without exception, pleased at the prospect of having the Western vigor infused into the administration of the new Institute, we entirely agree with Mr. Yost, that a great national association of architects cannot, and ought not to be carried on by the representatives of any section, no matter how wise and able those representatives might be. Sooner or later, questions will come up in which the architects of one part of the country are more interested than those of another part, and, whichever way the decision goes, one party will attribute it to undue local influence over the Convention, and we shall hear again the demand for separate organizations. As we have said before, our own opinion, which we put forth with becoming modesty, is that Washington comes nearer to being professionally neutral than any other of our large cities, and that for this reason, combined with the other weighty one, that it is the place from which are issued the commissions for erecting all the great national buildings, it would seem to be the best and most natural headquarters for the new Institute; but even with Washington as the usual place for conventions, we think that some sort of representation of members or Chapters at a distance is desirable. Mr. Yost says that no one would send a deputy to eat his dinner for him, and, under the present conditions of life, most men would certainly either eat their dinner themselves, or let it alone altogether; but if the conditions were to be changed, so that half a dozen members of a certain club, who happened to live in the neighborhood, could, by indulging too freely in Welsh rarebit on Saturday night, have all the other members howling with indigestion the next morning, it is tolerably certain that those who lived farther off would soon demand the privilege of having their representatives present on

such occasions, to revise the *menu*, and moderate incautious appetites. It is a club of this latter kind to which the new Institute should be compared. Its acts do not concern those members alone who are present at the conventions, but affect the fortune and reputation of all the members, and, indeed, of all the architects in the country. Among the measures which it will soon be called upon to adopt or reject are some, such as those for securing the licensing of architects, the protection of members from injustice, and the opening of public work to the profession, which will make a difference of very many thousands of dollars in the incomes of the architects of the country. These measures need, in order that whatever is undertaken may be successfully carried through, to be considered in such a way that every member, and, if possible, every respectable architect, shall have an opportunity to express his opinion, and thus be induced to interest himself in the subject, and join with zeal in enforcing the decision. With some sort of recognized representation, this great advantage can be easily obtained, as, on points of importance, local organizations, or even informal meetings, can discuss the subject before the meeting of the Conventions, and instruct delegates. Of course, care would have to be exercised to apportion the delegates fairly to each section of the country, but, if the matter should come up, either at the next, or at any future Convention, as we hope it may, there is no danger that the members will not act with all possible courtesy and fairness, and the importance of having seven thousand, or seven hundred, concurrent votes in favor of any professional movement, instead of seventy, or even a hundred and seventy, which would be about the total of all the voters present at all the Conventions of the Institute since it was incorporated, does not seem to need much explanation.

OUR readers will remember that a controversy took place in the course of the summer in Paris about the right of M. Eiffel to prevent other persons from making and selling pictures or models of his tower without his leave, and, as the property of artists in their works is recognized and respected in France, the decision of the court upon the matter has been looked for with interest. The newspapers on this side of the water seem to have imagined that the question was whether the tower could be considered a work of art, like a picture, so as to be entitled to the protection from copying or reproduction without the author's leave which pictures enjoy, but it appears that the matter was not so simple as that, and the point at issue really depended upon the ownership of the tower itself. By the contract between Eiffel and the French Government, the great engineer agreed to build for the Government a tower three hundred metres high, and, in consideration of this, the Government agreed to pay him fifteen hundred thousand francs, and to let him have the use of the tower until January, 1910, under certain restrictions as to the price to be charged for admission, and the persons to whom he sub-let the restaurant privileges, the sub-letting contracts being subject to the approval of the Government.

TEN months after Eiffel's contract was made with the Government, he made another with a goldsmith named Jaluzot, by which he granted to the latter for six years the exclusive right to the reproduction of the tower in large or small size, and in any materials whatever, and agreed to lend him the working-drawings, sell him the borings and remnants of the metal used in the construction of the tower, out of which Jaluzot intended to make little models, and sell them as being of the same material as the tower. Jaluzot proposed also to make small gold models, to be put in jewellers' windows as an advertisement, and he made a number of agreements with other jewellers for the use of the gold and iron models. Eiffel, moreover, was by his contract to receive a percentage of the price of all goods of this kind sold or rented. About a year after this contract was made, Jaluzot found that a model-maker, Dijeon, was getting out drawings for making a model of the tower, in copper, at one-fiftieth the real size, which had been ordered by one Pasquier, who intended to exhibit it in America in a sort of cyclorama, with a painted background, representing the other buildings of the Exposition. Jaluzot then brought an action against Dijeon and Pasquier for infringement of copyright, and an action of warranty against Eiffel to compel him to make good the loss caused by the infringement. The court, however, found that Eiffel, by his contract with the State, had conveyed to it all his rights and privileges connected with the tower, including the right of reproducing his design; that the concession given him in return comprised the right of admitting visitors to the tower and of sub-letting the restaurants, but did not convey back to him the copyright of his design, which, therefore, now belonged to the Government, and thus to the public. In selling, therefore, the exclusive right of reproducing the design to Jaluzot he sold what he did not own, and the sale was, consequently, void, but the court held that he was bound to make good to Jaluzot whatever damage the latter suffered through the mistake. Meanwhile, Pasquier had brought suit against Jaluzot for indemnity for the damage he had suffered through the interruption of his scheme for an American exhibition, and the court decided that he was right, and that Jaluzot should pay him twelve hundred dollars, which Eiffel, in his turn, should make good to Jaluzot, and ordered Eiffel to pay all the costs of all the suits.

NOT long ago a generous philanthropist sent to the Press Committee of the Paris Exposition twenty thousand dollars, with the direction that it should be given as a prize of honor to the most remarkable work shown in the exhibition. The principal competitors for the prize were the Eiffel Tower, Edison's phonograph, the Girard & Barré hydraulic sliding-railway and the Machinery Hall. After a rather exciting discussion, the prize was, at a recent meeting of the Committee, awarded to the Machinery Hall. As a considerable number of persons were concerned in this work, it was voted to divide the money among them. The architect, Dutert, was given four thousand dollars; Contamin, the engineer, three thousand, and the assistant architects and engineers, Charton, Pierron, Deglane, Blavette and Hénard, six hundred dollars apiece. The remaining ten thousand dollars was reserved for the workmen who were concerned in the execution of the great building, and the directors of the great Cail and Fives-Lille establishments were requested to send to the Committee the names of those of their men who had it particularly in charge.

WE take great pleasure in mentioning that Mr. Charles Follen McKim, the senior member of the well-known firm of McKim, Mead and White, of New York, has put twenty thousand dollars into the hands of Professor Ware, of the Architectural Department of Columbia University, to be used, under the direction of the Trustees of the University, as a fund for the perpetual maintenance of a travelling-scholarship, or fellowship, for the benefit of the graduates of the Department of Architecture in that institution. With the travelling-scholarship already founded in that Department by the Trustees of the University, in commemoration of the generous kindness of Mr. Schermerhorn, whose gift created it, and long helped to maintain it, the McKim benefaction will render the Columbia Architectural School by far the most richly endowed, as regards incentives to emulation among its pupils, of professional schools in this country, and it is much to be hoped that the large, and constantly increasing number of thoroughly educated men who receive its degree will utilize their unrivalled advantages to the credit of themselves and the profession, at the head of which, so far as training goes, they ought hereafter to stand. It is interesting, and at the same time gratifying, to observe how fond and proud architects whom fortune has favored almost always are of their profession, and how wisely and generously they contribute toward the advancement of the art which they have practised with so much labor, and, usually, with so many disappointments. With men in many, perhaps most other callings, the first thought, when circumstances place them unexpectedly beyond the need of daily toil, is to "sink the shop," to shun their late associates, and try to forget the career to which they have devoted their best years; but architects seem almost always to regard an increase of income as an extension of their means for learning more of their art, and, if they can afford it, for helping others to do the same. It may be a satisfaction to some of them to know that the generosity of a professional man is much more valued than that of a stranger by young men in the same profession, and the high regard which students feel for the more eminent architects will be greatly strengthened by the thought of the noble generosity of the latter toward them in return.

THE SAFE INSTALLATION OF ELECTRIC WIRES.[1]



The Gothic and the Renaissance.

WHEN the notice from your Secretary containing the news of my selection as a member of the committee to prepare a paper on Topic No. 3, "How can electric wires be run into buildings so as to insure safety from fires, also the best insulation for the same," was received, my first impulse was to immediately decline the honor, as I deemed it next to impossible to prepare such a paper unless it were filled with electrical terms and phrases that would tend to befog the whole subject. While the Association assembled here will compare favorably with any like number of representative men in the country, yet they are not supposed to be familiar with the new language invented for the benefit of those who deal with this wonderful force, electricity.

Knowing the great importance of this subject to you, to the great insurance interests, to the owners of property, and, in fact, the entire population of the country, I determined to come here and endeavor to handle the topic in my own way, and, I hope and trust, to your satisfaction and benefit.

The true American fireman never quails in the face of danger in the performance of his duties. The stifling smoke, the poisonous gas, the intense heat and falling walls have no terror for him, for these are dangers to which he has become accustomed. He has braved them all too often to fear them. But man, in his desire to enlist all the force of nature in his own service, has recently succeeded in capturing that wonderful and mysterious force, "the electric fluid," and has succeeded in converting it into a fairly good servant, when kept within proper bounds. As yet the tendency of the current to leave the path chosen for it and to take other and shorter ones has not been entirely overcome. Like the river that overflows its banks, it is too apt to cause damage to property, or injury, and sometimes loss of life, to persons unfortunate enough to stand in its path. With this mysterious force racing through the air above, the earth below, and entering stores, factories and dwellings, doing our work, furnishing light and conferring other innumerable blessings on the human race, for which we are duly thankful, there are attendant dangers that have not been entirely removed.

It is the desire of some people to magnify these dangers many fold. Unfortunately, the newspapers of the country have done more to misinform the public on this subject than all others combined. It is to be regretted that this should be so, as their power for good or harm is almost unlimited. Owing to the conflicting stories regarding the danger of high-pressure currents, I believe the firemen cannot be blamed if they look upon the conductors that run over, in front of, behind and into our buildings for the purpose of furnishing light and power as the soldier does upon the wily foe who would draw him into ambush and slaughter him without mercy. Under these circumstances, they cannot be blamed if they hesitate to mount the ladder raised among wires, or to secure a foothold upon the roof covered with the same, when they believe them to be death-dealing, and that it would be inviting certain destruction to come in contact with or in close proximity to them. "Knowledge is power," and, while this lack of knowledge of the nature of the electric current prevails among you, it must result in a certain amount of demoralization in your ranks when coping with your natural enemy, fire, in the presence of this new force, the danger of which you do not know how to avoid, not knowing just where it exists and to what extent. There is really nothing mysterious about the electric current, and there is no reason why the average citizen cannot fully comprehend the laws governing it. It is not necessary in this paper to discuss the various methods of generating the different forms of electricity. Most of you are more or less acquainted with the weaker currents produced by chemical action in the battery in connection with the fire-alarm telegraph. But it is my purpose to deal only with the more powerful currents used in producing light and power.

The bright, dazzling light seen at the points of the carbons of the arc-lamp, and the less brilliant light produced by the slender filament of carbon in the small glass globe of the incandescent lamp, is due to the conversion of the energy of the steam-engine or water-wheel through the medium of the dynamo-electric machine. This is no more mysterious than lifting water from the river or reservoir and forcing the same through long lines of hose to be directed by you upon the fire, this, also, being a conversion of the energy of the steam generated in the boiler of the steam fire-engine into useful work at a most opportune moment.

I am going to assume that I am addressing a body of men who are entirely unacquainted with electrical subjects, and will try and avoid as much as possible the use of technical terms which are meaningless to all but those engaged in electrical pursuits. First, I will try to explain the few electrical terms which I shall have to use by comparison with synonymous terms with which all of you are familiar.

There are two methods for supplying water to towns and cities for domestic use and for extinguishing fires, *viz.:* the gravitation and the direct pumping systems. In either system, the efficiency of the same for the purpose of extinguishing fires is determined by the pressure in pounds per square inch, or, in other words, the pound is the unit of pressure on the street-mains, service-pipes and on your leading hose. The electric current also flows under a certain head of pressure in order to do its work. As the pound is the unit of pressure in the case of water and steam, the volt is the unit of pressure in the case of the electric fluid. The gallon is the unit of measure for the quantity of water pumped by a steam fire-engine or flowing through pipes. In like manner, the ampère is the unit of measure for the quantity of electricity flowing through a conductor, an electric lamp or a motor.

As you all know, a certain amount of the energy developed in the steam fire-engine is wasted, when throwing upon the fire, in overcoming the friction of the hose, and the greater the length of the line, the greater the amount of loss from this cause. In like manner, the best-known conductors of electricity offer more or less resistance to the passage of the current. The unit of measurement of the resistance is the ohm. If you bear in mind these three terms or units and their application, it will aid you very much in arriving at a perfect understanding of the subject under discussion.

I will begin my illustration of the dangers of high-potential electric currents and of where they do or do not exist, with the simple series or arc-light current. In doing so, I will compare the dynamo to the steam fire-engine and the conducting wire to the line of hose. If we place an engine at a cistern of water, drop the suction therein, then lay out one, two or three thousand feet of leading hose, start the engine up and cause it to run at a good rate of speed, the pressure gauge will indicate in pounds the strain which the water exerts on the same. This strain or pressure, as you are aware, is greatest next the pump; midway between pump and the open butt it is only one-half as great; three-fourths of the distance it is only one-fourth as great as at the pump, and at the butt it will drop to zero. Were water as elastic as air and the lighter gases it would be possible to connect the extreme end of the line of hose to the suction or inlet of the pump, when the conditions would be the same, the water being compressed at the outlet and rarified at the inlet; in fact, a vacuum existing at that point.

These are exactly the conditions that exist in the dynamo, line of conducting wire and lamps run in series. Each arc-lamp offers a resistance of about five ohms to the passage of the current, and to force it across the space between the points of the carbon and maintain the arc requires a force or pressure of fifty volts (pounds). A fifty-light arc-dynamo running that number of lights would exert a pressure of 2,500 volts. This pressure would exist only at the outlet or positive end of the wire, the conditions being the same as those existing in the steam fire-engine and line of hose, only the line of wire, after passing through the lamps, returns to the negative or suction side of the dynamo. There being practically no resistance (friction) to the passage of the current after going through the last lamp, it resembles the rush of water into a vacuum created by the action of the lamp.

We now come to the question of danger to the person and at what points it exists on a circuit from a dynamo with fifty or sixty arc-lights in series. That there is danger from various causes none can deny. That some seek to magnify this danger and others unwisely seek to lull the public into a sense of false security by saying that no such danger exists is too true. I do not propose to array myself on the side of either one of these parties, but to occupy a middle position and what I believe to be the only safe one.

As the greatest pressure on a line of hose is at the outlet of the pump, in like manner the greatest pressure in voltage is at the positive pole (outlet) of the dynamo. If the hose is laid in a circle and returned to the reservoir, and a small pipe run from the outlet of the pump and connected to the coupling at the end of the hose, an amount of water proportional to the size of the pipe and the friction or resistance of the hose will flow through this new passage. In like manner, if a short wire of the same size as the line wire be connected to the terminals of the dynamo the entire current will pass through it, while none will traverse the main conductor and lamps. Should the short wire be so small as to offer, say, the same resistance as the

[1] A paper read before the National Association of Fire Engineers at Kansas City, September, 1889, by William Brophy, Inspector of the New England Insurance Exchange and published in *Fire and Water*.

lamps and main conducting wires, then one-half the current would pass through the former and the same amount would find its way through the latter.

The amount of current required for a circuit of fifty 2,000 candle-power lamps is ten ampères (gallons). The same would be required for one lamp, consequently five ampères would pass through the short wire and five through the lamps. The average resistance (friction) of the human body is about 2,500 ohms. The resistance of fifty arc-lamps is 250 ohms. If a person were to take hold of the wires at the connection with the dynamo one ampère would pass through his body and nine through the lamps. The body of the man offers ten times the resistance that the fifty lamps do, and, consequently, one-tenth of the current passes through his body, the remainder going through the lamps. I believe that a person in this position would be severely shocked if not instantly killed. No well-informed life insurance agent would care to insure a man for the ordinary amount of premium were he to declare his purpose to indulge in such practises. As I said before, the greatest danger lies here, and contact with the outgoing and returning wires would result disastrously to any one.

I will now assume that a person can place himself in contact with the conducting wire midway between the line of lamps and the dynamo, or that the current passes through twenty-five of the lamps before reaching him. Now, if on the other hand, he could touch the negative pole of the dynamo, one-twentieth of the current would be diverted through his body, while the other nineteen-twentieths would pass through the lamps. This also would be a dangerous experiment to undertake, yet not so dangerous as the other one.

I will now assume that the wire is looped into a store in which are placed five lamps, the combined resistance of which is twenty-five ohms, and the electro-motive force in volts is 250. In this case a person could grasp both wires, where they enter and leave the building, without danger, the resistance of his body being 100 times greater than that of the lamps. All this goes to show that the electric current, like any fluid, will follow or flow through the easiest path; and where the human body comes in contact with a conductor that offers greater, equal or considerably less resistance than the person, death or serious injury is sure to follow. If the bare wire is grasped with both hands at any point, and should the wire be broken between the points of contact, death will be the result. You may wonder why it is that so many deaths are reported of persons who, through accident or ignorance, come in contact with electric-light wires, when the conditions just named do not exist. In reply I will say that such conditions do and must exist in all cases where accidents of this kind occur, although the published account does not make it appear so.

Water seeks and finds its level at the ocean, which we may call the zero point. Electricity finds its level at the earth, which we call its zero point in the matter of resistance. The resistance of all electrical conductors is in proportion to their size, decreasing as their cross-section increases. The earth, being infinitely larger than any other conductor, offers practically no resistance or obstruction to the passage of the current. The constant tendency of the current is to seek the earth, so when connection to "ground," as we call it, is made on any two points of an electric-light circuit, a portion of the fluid will be diverted from the line to the earth at one point, and will return to the line and dynamo at the other. Any one point of an electric-light circuit may be in contact with the earth for days, weeks or months; but so long as the insulation of the rest of it is perfect, there will be no escape of current from it or to it at the defective point. Should a second connection be made to ground at another point on the current, however, a portion of the fluid would pass from the positive side of the wire to ground and return through the same to the negative side at the point of contact before mentioned. I will assume now that these contacts are made nearer the positive or outgoing wire, and equally near the negative side of the dynamo, or inlet, so that no lamp will intervene. The entire current would pass from one of these points through the earth and the lights would cease to burn. In that case the station attendant would quickly know that something was wrong. He would know it as quickly as the engineer of a steam fire-engine would know when the hose burst.

We will now suppose that contact is made through the earth with the circuit as above described, with the exception that contact is made at one of the points through means of the human body. Death would no doubt be the result. The conditions would be precisely the same as if the person grasped the outgoing and returning wires, the earth offering no resistance to the flow of the current. Most of you have heard of death caused by contact with iron wires hanging in the street, which in themselves appear to be harmless. These accidents occur in various ways. Sometimes it is a good citizen who seeks to remove the obstruction from the path of his neighbor whose horse and carriage may be coming along soon: or it may be the young boy impelled by his natural desire to investigate and handle anything he may see, who completes this divided circuit through himself to earth with fatal results. You can see that the conditions in this case are the same as if the two wires were grasped at a point near or at the dynamo. There is this difference, however, between contact made through the ground, or "grounding" the wire, as it is called, and contact made from wire direct or "short circuiting," as it is called. The points of contact with the earth may be on widely separated points of the circuit; but direct contact with points differing widely in pressure or potential must be made at points where the wires come near together as a rule. If the circuit is grounded midway of its length, and again through a person near the dynamo, but one-half the amount will pass through the body which would if the conditions were as before described.

I have thus far dealt only with the arc-light circuit with lamps in series like your fire-alarm boxes, bell-strikers and gongs, where a constant amount of current passes over the line, but under varying pressure. I now come to the so-called transformer or converter system, where the transformers and lamps are run in parallel or in multiple, the alternating current, by some called "the deadly alternating current," being employed. It is the apparatus which produces this current that is proposed to be used for the execution of criminals in New York State. With this system a pressure of one thousand volts, sometimes 2,000, is maintained throughout the entire length of the primary or street circuit. The conductors are of necessity run in parallel lines in this and the lamp or house circuit. To the street or primary circuit are connected the transformers or converters, in which is produced a current of only fifty volts, by virtue of the peculiar action of the high potential alternating current generated in the dynamo. In the iron box or outer shell of the transformer is an iron core built up of thin plates, on which are wound two coils of wire, one about No. 16 gauge, the other, say, No. 6. To the first is attached the primary or street circuit, and to the other the secondary or lamp circuit which is carried to the interior of buildings.

In this system we have a constant pressure at all times, but the current varies in amount with the number of lamps in use. Unlike the series or arc-lamp light system the resistance of the circuit decreases as the number of lamps is increased. The wires might be likened to two canals of unequal level, the water from the upper running through sluiceways, turning water-wheels and emptying into the lower, each lamp and each converter forming a circuit of its own between the two main conductors, each taking its own small quota of current from one and returning it to the other. The main conductors are not one continuous line, like those of the series or arc-light currents. On the contrary, two parallel wires are run out in the section to be lighted, and they are not connected at the extreme ends.

In the arc-light or series system the resistance increases with the number of lights. In the alternating system, with transformers and lamps in parallel or multiple, the reverse is the case. Every lamp put in circuit reduces the total resistance of the same. The total resistance of a circuit connected to a 1,000-light dynamo on which is placed twenty-five forty-light converters, when the entire number of lights are burning, would be twenty ohms, not including the resistance of the wire in the circuit. With but one lamp in circuit the resistance would bo 20,000 ohms. In the first case it is quite evident if a person were to grasp the two main conductors, and this were a continuous current flowing in one direction, no evil effects would be felt, owing to the high resistance of his body and the low resistance of the circuits; but in the second case the reverse would be true, and it would be dangerous to place one's self in circuit by grasping any part of the conductors not perfectly insulated. In this instance, however, we are not dealing with a continuous current flowing in one direction, but with one whose course or direction is changed some 16,000 times or more per minute. A considerable amount of the energy of the dynamo must be used to change the direction of this rapidly moving current, and there must be a considerable increase of electro-motive force or pressure at that instant that is not measured by the voltmeter. This may be partially illustrated by the action of the pressure-gauge on the pump of a steam fire-engine when it is forcing water through a long line of hose. The fluctuation is very marked near each end of the stroke, the increase of pressure being greatest where the piston attains its maximum speed, and least where the direction of motion is changed.

Each transformer is a generator of electricity, as well as the dynamo, but in a different way. The primary current traverses the coil of wire wound on the iron core, and converts it into a magnet that in turn produces an electric current which finds a comparatively easy outlet through the low-resistance lamp-circuit, for the resistance of forty lamps exclusive of the wire is only one and one-fourth ohms, the pressure but fifty volts, and the amount of current forty ampères, or twenty times the amount generated in the primary coil. With one converter in circuit and the forty lamps burning there will be a resistance, not including the line wire, of only 500 ohms, and the joint resistance of twenty-five converters will be but twenty ohms when the entire number of lamps are burning. You will see by this that a person coming in contact with the wires of a 1,000-light alternating dynamo when that number of lights are burning will not be seriously injured because of the relatively high resistance of his body. The current, following natural laws, will traverse the path of least resistance, *viz.:* through the coils of the converters.

With few or not any lights burning on the converters in the circuit the danger is very much increased. I will now suppose that the lamps on the circuits of one or more of the converters are turned off. The resistance of the primary or street circuit increases as these lamps are turned off, owing to what is termed the counter-electro-motive force of the converter. As before stated, the primary current from the dynamo circulates through the coil wound on the iron core of the converter, transforming that, for the moment, into a powerful magnet, which, in turn, generates a current of electricity

which goes through the lamps in the secondary circuit. The course of this current is directly opposite to that of the current from the dynamo. When the lamps on this secondary circuit are turned off the outlet for this current is cut off and it seeks one through the primary wires; but as its course is opposite to the current from the dynamo, it resists the flow of the latter through the converter. I will now suppose that there is but one lamp out of 1,000 burning, which, by the way, is an extreme case. The resistance of the primary circuit would be 20,000 ohms. If now a person should come in contact with the two wires of the primary circuit midway between the dynamo and the end of the conductors he would receive the current from the dynamo as well as the counter-current from the converters on the circuit beyond the point of contact. The current from the dynamo would come from one direction, while that from the converters would come from an opposite direction on the same wire, and both pass through the person, who offers a path of low resistance to the other wire. Then each in turn pursues an opposite course to that from which it came, thus intensifying the terrible shock to the unfortunate being there placed. This, though, is an exceptional case, and one that I might say never occurs, thanks (in this case) to the desire of the human race to get all it pays for and something more. There are always a large number of lights, aside from those intended to burn all the time, that are never turned off, whereby the dangers attending the transmission of alternating currents are reduced and the conditions just named rendered impossible. Nearly always, however, there are idle converters in the circuit which are a source of danger to persons, this danger being happily limited by the low resistance of the circuit when a considerable number of lamps are burning. Eight lamps in the circuit reduce the resistance to the average resistance of the human body, and as the number increases the danger decreases proportionately. I do not in this case include the resistance of the wire, which it requires an increase of from one to five per cent of the electro-motive force to overcome. It matters not whether contact is made directly with the conductors at adjacent points by the person or at widely different points through the medium of the earth, as in the case of series or arc-lighting currents.

No doubt you have read of persons being killed by taking hold of or coming in contact with an apparently harmless iron wire hanging in the air. In all of these cases a "short current" of lower resistance than that of the main is completed through the unfortunate person. In view of the somewhat increased danger attending this system of lighting I would advise, first, that these circuits be so constructed that they can be readily distinguished from the low tension direct system of incandescent lighting and the series or arc-lighting systems. I would also have them under the immediate control of the fire-department by means of cut-off switches, placed at intervals along the entire line, so that the wires could be disconnected from the dynamo at any point where they might interfere with the work of the department during the progress of a fire. Then they could be handled or cut without danger. This same plan can be and perhaps should be adopted with arc-light circuits. It is being done to some extent now in New England.

You may have heard of men who have said that they "have taken a thousand volts from an alternating dynamo." That is a very misleading expression. I am charitable enough to suppose that through ignorance they believe what they say; for I believe no one ever did what they imagine they have done, and lived to tell of it. With a large number of lamps in multiple or between parallel wires, it is next to impossible for one to take the total output of energy of the dynamo. In all of those cases the dynamo was doing a large share of its regular work. You may also have read accounts of accidents which would lead you to suppose that death lurked in every inch of an electric-light wire, and that the current would leave the same to maim and kill unoffending people in a most mysterious manner. Such is not the case. Those accidents never occur without a well-defined cause.

I now come to the important question of the proper insulation of wires. There are several kinds of insulating coverings for electric wire that are all their manufacturers claim for them, *viz.:* the very best that can be produced at the present time, capable of withstanding any electrical pressure required for all present purposes. They add very materially to the cost of wire. The basis of nearly all the best insulation is rubber. There are two causes that naturally deter the careful electric-light manager from investing in the best form of insulation for overhead lines. First, none of it has yet undergone the severe and searching test of time, owing to the comparative youth of this great industry. You are all familiar with the various brands of rubber hose, and know something of the length of time it can be relied on for effective service. Second, a net-work of wires of all grades and conditions is strung in the air above the electric-light mains, the telephone, telegraph, electric-time, district-messenger, private line, the tramp wire attached to fixtures, poles and buildings without permission from the owners of the same, and the miles of "dead" and abandoned wires that are not worth taking down, and are left to the tender mercies of the elements, sooner or later to come down across the best insulated wires, quickly cutting through the covering and opening a path for the escape of the current, causing loss of life may be, or damage to property by fire. Under these circumstances the managers are in a great measure excusable for the continued use of a low grade of insulation so long as they are menaced by these unwarrantable dangers. The insulation most universally used for outside wires is the much-talked-of "underwriters" or painted cotton insulation. It is a very good insulation if kept dry, but when wet becomes an excellent conductor. I would advise you to treat any wire carrying high-potential currents with the greatest consideration when it is covered with this material, and to give it all the territory you can spare when it is water-soaked from any cause. There are other grades slightly better than this, but they are only attempts to produce something cheaper than the higher grades.

Now as to the best methods of carrying wires into buildings. All wires should be supported on insulators such as glass or porcelain. They should not be fastened to the building by wooden cleats. None but the very best insulation should be used on or near iron fronts, and it should not come in contact with the same. Wires should enter the building through glass, hard rubber or porcelain bushings, and they should be separated by a space of about one foot. A cut-out switch should be placed where they enter, such switch to be accessible to the fireman. It should indicate whether or not the current is in the building, and should be an absolute cut-off. This applies only to arc-light circuits.

We now come to the question of danger from fire. I will say right here that when an electric-lighting plant is properly installed, whether the current be furnished from a central station or a dynamo on the premises, the danger of fire occurring from the same is reduced to a minimum. The causes that lead to fires from the arc-light system are very few indeed. The amount of current being constant and far below the safe carrying-capacity of the wires, danger of overheating the same is avoided. Imperfect joints, loose connections, or any other obstructions of this nature to the passage of the current may and sometimes do cause fires, the electro-motive force being sufficient to overcome such obstructions, and in doing so, setting fire to any inflammable material intervening. The arc-lamp itself has been the cause of the greatest number of fires; pardon me, I should say the incompetent, negligent attendant, by leaving bottoms intended to be closed open, or by not removing broken globes when discovered.

Dangers of fire from the direct, low-tension system of incandescent lighting are or may be more numerous, providing they are permitted to exist. The pressure or electro-motive force is nearly constant, and is far below that point considered dangerous to life. The amount of current varies with the amount of light required. In large stations the currents from several large dynamos are sent into common mains or feeders. The current is sufficient in quantity to heat to a dangerous degree, or even to melt the small house-mains down, if for any cause the resistance of the circuit should fall greatly by reason of ground-connections or short circuits. To prevent this, metals of a low fusing point are inserted, which melt long before the temperature of the wire reaches a dangerous point.

Poor insulation and lack of ample separation is another source of danger. In wet or excessively damp places, wires should rest on nothing but insulating supports, no matter how good the insulating covering may be. They should not rest on wood or be fastened under wooden cleats. A safe rule to apply to all wires concealed between floors and ceilings and behind partitions, is to use the same care as would be necessary were they not covered with any insulation at all. The general practice in New England is to use the very best insulation for this purpose, and by ample distance between the wires themselves, and gas and water pipes, to avoid danger from fire.

The transformer or silent dynamo used in the system of that name, has been excluded from the interior of buildings in New England. The reason for this is that the insulation sometimes burns slowly and a considerable amount of smoke results. Should this occur in a dry-goods store, as well as some other establishments, a considerable loss would result from this cause alone, to say nothing of the loss caused by water.

The wires of the secondary or lamp circuit can be touched and handled with safety, as the pressure is but fifty volts, and they are subject to the same rules and requirements as are those from the direct incandescent dynamo.

The pressure in the primary wires leading to and into the transformer exceeds the limit of safety, and when they are attached to or placed in buildings, nothing but the best insulation should be used. The transformers themselves should when attached to buildings, be well insulated by blocks of well-painted wood, porcelain or glass.

Sun-dial Mottoes. — Now, listen to the voice from the tower of Long Sutton Church — "Sunshine for all." That motto sheds a blessing through the air. It is sweeter than sound of church bells; it is at once a canticle of praise and thanksgiving. A sister motto we hear of at Bruges — Bruges of the many shrines, the shining statue, the paintings divine, the musical carillons: "May no hour pass which it is not a delight to remember." But of sun-dial mottoes the most cheerful and serene, the crown, is this:

"I count the bright hours only!"

It is found at Cawdor House, near Glasgow, springing with life after two hundred years; at Bournstream House after nearly a century more. It is on the walk behind Harrow Chapel; it is in Wales; it is in a village near Como, at Campo Dolcino, and in many other places where there have been healthy, happy minds. — *The Gentleman's Magazine.*

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF JOSEPH H. WHITE, ESQ., BROOKLINE, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued only with the Imperial Edition.]

SANTA PAULA ACADEMY. MR. ERNEST A. COXHEAD, ARCHITECT, LOS ANGELES, CAL.

THE building is of frame with stone foundation. First floor contains a large assembly-room to seat 100 children with recitation-room adjoining, principal's room, hall and cloak-rooms. Second floor contains three recitation-rooms and store-room. Total cost including heating, $9,500.

METHODIST EPISCOPAL CHURCH, SEABRIGHT, N. J. MR. W. B. BIGELOW, ARCHITECT, NEW YORK, N. Y.

THE church is to be built for $7,500 of washed brick with open-timber roof of yellow pine. The seating capacity is 250 for the church and 150 for the Sunday-school which are so arranged that they can be thrown together by means of screens sliding down into the basement.

CHURCH OF THE ATONEMENT, EDGEWATER, ILL. MR. HENRY IVES COBB, ARCHITECT, CHICAGO, ILL.

THIS church, which stands on a large lot surrounded by oak trees, is being built of mottled Michigan brownstone.

HOUSE FOR COLONEL DANIEL FREEMAN, INGLEWOOD, CAL. MESSRS. CURLETT, CUTHBERTSON & EISEN, ARCHITECTS, LOS ANGELES, CAL.

HOUSE AT JAMAICA PLAIN, MASS. MR. F. W. WESTON, ARCHITECT, BOSTON, MASS.

THE THEORY AND HISTORY OF COHESIVE CONSTRUCTION.[1]



Ladies and Gentlemen,—This honorable Society of Arts has paid me the distinguished compliment of inviting me to describe my knowledge, and what my experience has taught me in regard to the Arc Vault System, which at present I am constructing in the new Library erected in Copley Square.

This construction, to which I am entirely devoted, I shall in my limited way endeavor to explain. Whatever knowledge I may possess on this subject, is not so much due to my researches and investigations, as to the wisdom of my professors in interesting me in the study of the arts and the applied sciences.

I treasure with gratitude the memory of these professors who imbued me with this knowledge, among these gentlemen especially are D. Juan Torras, D. Elias Rogent and D. José Mamjarres.

Though the principal object of my dissertation, perhaps the most interesting and the one which I know to be of the most advantage, ought to be the purely experimental part of the system which I will call "Cohesive System" applied to the vaults called "Timbrel Vaults," I have to ask the kindness of this select audience for some theoretical divisions, and brief words of explanation, because in speaking of the cohesive system in which consists my specialty, I am aware that even to the initiated in the science of construction there might occur objections. However, it must be borne in mind that as the system is applied in the construction of the new Boston Library it is not reduced strictly to vaults neither is it placed in exclusive competition with brick arches, but consists in one complete system of construction, including walls, partitions, floors, staircases, girders, ceilings, etc.

The great and surprising advantage of the vault which we call "Timbrel Vault" over the brick arch we will find equally in walls, girders, roofs, etc.

I do not pretend that this system is entirely new, it is as ancient as the opposite system which we can call the "Gravity System;" but I must explain that the cohesive system was as frequently practised by the ancients as the "Gravity System" but after the "Cohesive System" reached the height of its splendor in the Middle Ages it gradually disappeared in the same proportion that modern civilization and the Renaissance approached. Was the loss due to the fact that in this great constructive age the architects were builders? Or was the disappearance of this form of construction in Europe caused by the loss of the influence of Oriental architecture—an influence that was felt through many centuries, forming this new and great classic era in the art of the Arabs, or rather the Moorish Spanish architects, who know how to create the decorative construction and the constructive decoration in the "Cohesive System," as the Greeks, centuries before, and the Græco-Romans in their style, exemplified in their system of construction by gravity? With these explanations I now enter into the discussion of my subject, which I divide as follows:

1. Historical Part: Ancient, Middle Age, Renaissance.
2. Theory and coefficients of application.
3. Modern applications.
4. Artistic or æsthetic importance.

The first part of Historical, I subdivide as follows:
Ancient Age: Egyptians, Assyrians, Greeks, Romans.
Middle Age: Arabs, Byzantines or Mussulmans.
Renaissance: Italian, Spanish.

Much has been said lately about the vaults, especially the "Timbrel Vaults"; In the first place against their utility and application, and secondly regarding their origin and use. The most erroneous and contradictory ideas have been emitted in regard to this vaulting, as before occurred with the arch, the latter having been credited to the Romans. To-day there are known and studied by exact designs a great number of antique monuments, some extant and others in ruin; we can from these draw truths and base history.

The use of vaults of brick, stone or the timbrel, as well as the arch, is very ancient, and was known before the Romans, who did nothing but improve, making their use general, giving to them an æsthetic character which had not been done before, because the vault and arch had hitherto been used solely as a constructive necessity, where blocks large enough to cover the space could not be procured. Probably for this reason appeared the "Timbrel Arch."

In proof of this assertion allow me to cite the following.

In a tomb situated in the vicinity of the city known by the name of the City of Sepulchres, near the City of Thebes, there in an elliptical vault constructed of brick not burnt by fire. It is 2 metres 59 centimetres in length by 1 metre 42 centimetres in height. Among the hieroglyphics which adorn this monument can be discerned the name of Amenophis; it must then belong to the time of the eighteenth dynasty, dating, therefore, seventeen centuries before our era. This is in regard to the brick vault in general. Another specimen in regard to the "Timbrel Vault:"

In one of the Pyramids of Egypt, at Gizeh, a tomb discovered by Colonel Campbell (See Figure No. 1) forms an arch of bricks not burnt, these bricks measure 0.170 metres by 0.126 metres by 0.050 metres.

In order to give to these bricks the necessary curve it is understood, that they must have been curved before drying them.

The construction plainly shows that the flat brick was used with the idea of decreasing the number of pieces, closing the space with the least possible joints; thus, to give more strength and cohesion to the arch, they placed four rows, one on top of the other, breaking the joints, constituting through this medium an arch without joints (see the "*General History of Architecture,*" by D. Daniels).

It is seen by this specimen that the cohesive form was born, like the arch, and is not any particular invention, nor originated by any given civilization, but is only the fruit of necessity, a spontaneous resource of the most ancient times.

This plainly shows that neither the brick vaults, stone vaults, nor timbrel vaults, can be said to belong to any civilization. These circumstances necessitated the creation of them in every country.

[1] An essay on the Theory and History of Cohesive Construction applied especially to the Timbrel Vault, read before the Society of Arts at the Massachusetts Institute of Technology, Boston, October, 1889, by R. Guastavino, Architect.

The Assyrians, encamped between the rivers Tigris and Euphrates, with abundance of clay at their disposal and especially with asphalts and mineral oils improved the manufacture of bricks; using them as a fuel they came to the practical idea of burning the clay, and instead of using the raw bricks they used them burnt. For such purposes ovens were needed; thence the necessity of covering, and closing the spaces without lumber or stone, but with bricks and terra-cotta. Thus the dome and cone shapes that they were using in their ovens were developed.

The ovens for the manufacture of bricks were large domes constructed with brick or tiles of large dimensions (Figure 3), the bricks lying flat and advancing one over the other, about an inch, and in this manner formed the curve (see the "*General History of Architecture*," by D. Daniels, already mentioned.)

The dimensions of the bricks used in the library of the palace of Khorsabad and in the palace of Nimrod were 35 by 32 by 7 centimetres, or 14 x 12 x 2 inches.

The gardens of Semiramis at Babylon, and the subterranean passages under the Euphrates were nothing else but vaults: by this we can plainly see how ancient are these vaults. The Greeks and Romans did not use the brick in a better manner than the Assyrians; but their facilities for obtaining clay and fuel were not favorable, and so these nations were more devoted to stone construction. The Romans had a marked predilection for the use of stone, as is illustrated by the sewers which they left in Valencia, Spain, similar to those in Rome, although clay was plentiful in that country: through these sewers of Valencia a wagon can easily pass. The aqueduct of Segovia is another specimen again showing their predilection for stone; it is a wonderfully magnificent structure, and a model of static equilibrium. When the brick was used, it was only as a small voussoir, as can be seen on the Flavian Amphitheatre or the Colosseum, not only in the primitive works in this building, but when rebuilt at different periods, where they left good specimens of their progress in works of brick, in vaults and in walls, but always in plain brick arches with voussoirs.

The only specimens which seem to have existed as vault work, or "timbrel" of brick placed flat in imitation of the specimens (Number 1, Egyptian, and Number 3, Assyrian) are some that were probably in the Baths of Caracalla. The architect found difficulty in furnishing light to the central part, which could only receive it through the penetrations in the vault. But for this purpose it was necessary to weaken it and it was constructed with brick arches, like those of the Colosseum and others; they had to be given a great thickness and required walls of immense resistance. It seems that the result desired was at last obtained by constructing the vault with bricks on end, or a "timbrel," using I suppose Puzzolana (Puzzoli) cements, which were slow-setting but good, and using centres which supported the vaults until the mortar had set, but of this we cannot be sure.

I will have to mention, since I commenced to speak about the Baths of Caracalla the following paragraph taken from the treatise on "*Vaults and Bridges*," by Samuel Ware.

"The recollection of the solar bath of Antonio Caracalla, in the present age (when we assume to ourselves so much credit for the invention of iron bridges) may serve to abate some of our enthusiasm. It was a circular building 111 feet in diameter, the roof a dome, composed of *copper and brass*."

By the foregoing it would appear that the cancelli were ribs, and the concameratis *plates*, similar to what may be seen in our iron bridges of to-day. From this historic description cited by Samuel Ware, it follows that if the small domes and arches were constructed with "timbrel arches" the large dome was certainly not built in the same way.

The Middle Ages: — The true epoch of the development of the dome was in the Middle Ages, but no specimen of the "timbrel vaults," or with the brick set flat against the centre, is left. We must, however, for several reasons call attention to the construction of the arches and domes in the Arabian epoch, and of the Mussulman in Persia; a country where a new and powerful civilization was already developed, on the spot where the Assyrian left the trace of his ceramic work — a civilization that inspires us to-day under the vast cupola of St. Sophia.

The cupola was the dominant and Oriental line of their monuments, see (Coste: architect, 1840 and 1841, "*Voyages en Perse*"). The Oriental civilization had great influence in the Antique Byzantium. Not only it gives to Byzantines the richness of color and decoration, but the base of new Classic ideas in the architectural arts.

"The Arabic Arts": — The greatest development is in Cordova, Sedilla and Granada, Spain. Under the influence of the beginning of this civilization was due the mode of construction of St. Sophia, the grandest and most finished model of the cohesive cupola. The cupolas of Persia are all constructed over brick walls, and are the continuation of the same wall with the same material.

From the cupola of St. Sophia to the Renaissance were constructed several cupolas on the cohesive principle. The principal of these cupolas were the mosque of Soliman II, and Sultan Ahmet, the Holy Apostles of Constantinople; Santa Maria in Cosmedin, at Ravenna; Saint Mark, Venice, and the Cathedral of Zamora whose cupola is one of the largest and most beautiful in Europe.

After this epoch in the Renaissance, the most remarkable structures are: Santa Maria del Fiore, Chapel of the Medici, Baptistery of Florence, St. Augustine, St. Peter of the Vatican, Rome; the Madonna de la Salute, in Venice; Ste. Geneviève, Paris; St. Paul, London; The Virgin of the Poor, in Valencia, Spain.

Arriving here we think proper to call attention to one important point: all the cupolas constructed, up to the epoch of Constantine, were with brick and concrete in the Arabic style, following the constructive lines without altering the æsthetic forms; and in all cupolas built after Constantine, up to the beginning of the period of Brunelleschi, in Florence, including the dome of St. Paul, in London, the exteriors are not the representation of the interiors. In the last one mentioned, the interior dome or decoration is a hemisphere, the second one is of the same shape as a truncated cone, and the third one is the exterior dome.

The whole does not represent the progress of the art of construction, nor the way to apply æsthetical forms.

This anomaly is due to the fact of the disuse of the hydraulic mortars of the Romans, Arabians and Byzantines, and that the art of manufacturing these materials, which constituted the base of their cohesive construction, was lost. The Byzantines used baked clay and lava of Vesuvius, or pumice-stone in the construction of St. Sophia.

The architects of the Renaissance, especially in Italy and Spain, were greatly impressed by the works of the Romans, Byzantines and Arabians, and wished to imitate their bold construction, but they did not have at hand, either the materials or the skilled laborers; therefore, they employed plaster, and then was carried the "timbrel arch" along the coast of the Mediterranean from Murcia to Valencia, Barcelona and Genoa, and, finally, to Naples. In all these parts will be found remains of the "timbrel arch." This epoch demands great attention because of the many facts it supplies to aid us in this study.

When the architects of the pontificate, in order to give the richness and grandeur called for according to the epoch, took for their models the Roman and Byzantine construction, as already stated, they had neither the material nor the skilled labor, consequently it was impossible for them to imitate, when they had only common air lime and plaster. The first they found impossible to use in constructions similar to St. Sophia or the Cathedral of Zamora, or the Arabian cupolas. About the second they soon found that the unlimited expansion of the plaster, that only stops when fully saturated, that is when it loses its power of absorption, compelled the architects to supply walls of enormous thickness. Besides this disadvantage, when the plaster has arrived at this condition its strength is gone; loosening the bricks, principally where the building was exposed to the weather, or subject to alternate changes of humidity and dryness. In consequence, its use was limited to very heavy walls, and for ceilings having wooden beams and wooden boards, over which were laid the Arabian tiles, if it was a roof, and mortar and flooring-tiles, if it was a floor.

In some cases the "timbrel vaults" were used as a ceiling and floor, having two or three thicknesses of tiles, with plaster, and the haunches were filled with pottery; this pottery was levelled over with rubbish and mortar, finishing with flooring-tiles.

It is necessary to remark that all of this construction was used only in large buildings, such as convents, palaces and churches, where the walls were very thick, amounting to one-third of the full span, and where the character of the building was a guaranty that the ceilings would not be abused, otherwise it was necessary to patch and repair every few years; but in the ordinary building it was only used in small spans, such as 18 to 20 inches between beams, using three tiles, or two courses of their bricks, set flat, over the centre, and in this state it has remained until the present date.

The first time that cements were generally used in modern days, was from 1845 to 1850; from this date commenced the Renaissance of the "Cohesive Construction." The modern Roman cement that Mr. Parker invented, and patented in 1791 and 1796, was so dear, and the conditions of setting were so slow, that its introduction into buildings was much retarded.

This cement in the beginning was called "Parker's Cement," its author called it Roman cement, having the idea that he was reviving the old Roman mortar. The other cement called "Medina," introduced shortly after, had the same defects. Mr. Aspdin on the 21st October, 1824, took a patent for the formula of the celebrated Portland cement.

This cement was given the name by the author, Mr. Aspdin, because when it is good, and is smoothed with the trowel, it is very similar to the Portland stone when it is polished. With this, I conclude the review of this form of construction, the antique and Renaissance, passing to the modern epoch.

As we can observe, all the timbrel arches of this Renaissance epoch, existing in Italy, as well as in Spain, are constructed with plaster material which does not meet the exigencies of good construction, consequently it is natural that no technical academy in Spain or Italy has taken into serious consideration such empiric construction that has a tendency to lamentable accidents. France and England we will not take into consideration, because like the other nations of the North, they have not bricks of the dimensions and conditions for the cohesive form: they have bricks of a small top and bottom surface, that is 4 x 8 inches, when generally the type for the bricks for the cohesive system are the Assyrian bricks, or the bricks of the Orientals, the dimensions of which were about 12 to 14 inches long, 6 to 8 inches wide, and 1 to 2 inches thick.

In Spain where this system has been used, and is still in use on a larger scale than in any other country, there does not exist any treatise or a single work on the theory of this construction, nor a single scientific explanation of this manner of building, not even an empirical explanation which can satisfy curiosity.

Up to the years 1866 to 1868, the professors of the Academy of Barcelona, one of the most illustrious of Europe, and a city where tiles are more in use than in the rest of the world, did not commence to pay any attention to this style, and when at last they did, it was only to comment incidentally on its resistance and its possible utility; but they did not make it a study, notwithstanding the fact that they were constantly walking over floors constructed by this system. So small was its significance to them as a science! On the other hand, this want of attention is explained by the lack of cements proper for such kind of construction. The want of proper cements, and of an invariable brand, on which to base the calculations, was one of the main obstacles which involved the Catalan and Valencian architects.

The works of this character that I have constructed in Spain, as, for instance, the manufactory of Battlo, in the Corts de Serria, where there are employed 2,000 people with 1,000 looms and 64,000 spindles; the other manufactories of Vidal, Muntadas & Company; the woollen manufactory of Carreras; the glass-kiln of Cassademun, with one arch of 65 feet span, and only 10-inch walls, and the cupola of the theatre of the town of Vilasar, 61 feet span, are all permanent and durable buildings, the arches of which were built having the first two courses of plaster, and the others with cement, representing fifty per cent of the construction with plaster, as I used in my first work in this country, when we knew that the excess of plaster is dangerous, if the walls and rods are not stout enough to resist the expansion.

In some cases the risk and danger caused by the irregularity of the materials were so plain that the workmen were afraid, compelling me to remain in the works to inspire confidence and success.

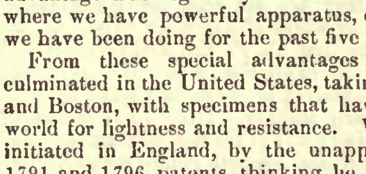
The progress verified in Spain, particularly in Barcelona, in the special construction that we have now under consideration, was due to the studies and teaching of the professors who were debating for several years how to improve their respective specialties, and the way to obtain new practical systems of construction, knowing the fact that the progress of material required a change and progress in construction; but their noble aspirations were restricted having no facilities, and it was necessary to satisfy themselves by recommending the theories of Vicat about the use of cements and other applications well-founded.

Nothing was done about investigating these structures, to which I have referred, and no co-efficients were derived. This only can be obtained when we can depend upon the materials with mathematical regularity, and with powerful apparatus for determining their reliability.

In countries like this where we can find more than twenty guaranteed brands of quick-setting Portland cement of different degrees, and in a country where the clay can be used for those constructions with advantage and regularity of manufacture, and, finally, in a country where we have powerful apparatus, co-efficients can be obtained as we have been doing for the past five years.

From these special advantages it seems these works have culminated in the United States, taking a natural stand in New York and Boston, with specimens that have no rivals in any part of the world for lightness and resistance. We now see that the movement initiated in England, by the unappreciated Mr. Parker, with his 1791 and 1796 patents, thinking he had discovered the old Roman cements, after passing the patented improvements of Mr. Aspdin, of October 21, 1824, may have an end in the city of Boston, and in the hands of the professors of this Institute, but not without the valuable assistance and undeserved confidence of the eminent architects, Messrs. McKim, Mead & White, Buckman & Deisler, R. H. Robertson, F. H. Kimball, T. M. Clark, De Lemos & Cordes, A. H. Pickering, D'Oench, etc., whose designs will always be remembered.

PICTURES AT THE PARIS EXHIBITION.



AS no notice has appeared in your columns of the Fine Art, or of the Retrospective Sections of the Exhibition, a few notes upon them may not be displeasing to your readers. Mere descriptions of the subjects of pictures are dry enough, and of little use to those who will never see the originals; but it must be inter esting to all of us to know how the different nations stand in relation to one another, and what artists of the several countries are likely to do honor to their native lands. As I have always considered that France stands the first amongst all the nations in artistic matters, it is only repeating what I have already written to say that her show this year is magnificent. But that she is so far ahead of us all, that she seems to be the only country which influences others who ask her aid, and that the good which one finds in certain schools is entirely due to her inspiration, are facts which come out stronger than ever this year. You may walk round most picture-galleries, and if you are acquainted with the painters' work, you may be sure, on looking at your catalogue, to know how each artist will treat the subject. But Frenchmen are imbued with a large amount of originality, and one is always coming upon surprises. Of course, this only applies to the modern schools. Amongst the Centennale collection, one knows, in advance, what to expect of Corot, Dupré, Rousseau and Troyon; but of the host of younger men, one can never guess what they will do next. Perhaps here and there (as in the case of M. Gervex) it were better to adhere to the old times, than to seek originality at the expense of decency, and it is grievous to see such a colorist prostitute his natural gifts in mere pictorial Zolaisms. But offences of this kind are few and far between—*pace*, Mrs. Grundy. There are, of course, many examples of the nude; but nudity, necessarily, is not indecent—indeed, many of the worst pictures are the semi-clothed ones.

But before speaking of modern pictures, it is advisable to notice some of the older men's work. In the Centennale, running through them alphabetically, we find eighteen by Bastien-Lepage, commencing with the portrait of his grandfather (painted in 1874), and ending with the charming little Holbienesque picture of Mme. K., when both he and his sitter were suffering from the same mortal disease. In between these (the last was exhibited, if I remember rightly, after his death) we have, amongst others, our old favorite, "Les Ramasseuses de Pommes de Terre," the "Jeanne d'Arc" (the least successful of all Lepage's work, and the exquisite little portrait of André Theuriet. The ten pictures by Baudry include the beautiful little portrait of M. Henri Schneider, and those of the Baron Jard-Panvillier and Paul Jurjewicz. Passing on we find all Bonnat's best work, and a dozen of poor Bonvin's—snubbed until the close of his long life, he is found here amongst those France does her best to honor. If forty-three Corot's cannot excite people's enthusiasm, it is no use trying to point out the beauty of "Biblis" and the "Bain de Diane," a lovely specimen of his silver mists, belonging to the Museum of Bordeaux. After gazing at nineteen of Delacroix's, we come upon nine portraits by one of the first of modern painters, M. Elie Delaunay. How masterly these are, and how individual in their treatment! M. Paul Dubois is a sculptor, but like M. Falguière, he delights in painting, and proves himself a first-rate portraitiste. Géricault was a powerful painter and a good colorist—witness his study of the backs of some twenty horses standing in a row.

Manet is represented by thirteen of his works, and it is interesting, now that people are beginning to believe in realism, and that M. Claude Manet is patronized by juries and hanging-committees, to see the early efforts of the first impressionist. In spite of Mr. Frith, R. A., and in spite of the experience gained by twenty-eight years art-study, I must fain confess to a certain admiration of Manet even now in my old age. He is provokingly fond of looking at things from the ugliest point-of-view; his "Bon Bock" is hideously vulgar, and his love of violet offends my taste; but I still admire the force with which his little "Fifre" is painted, and his "Toreador tué," would not have disgraced Velasquez—as a mere sketch. Indeed, it was probably the dead figure by the great Spaniard in the London National Gallery (which is such a marvel of foreshortening) that suggested to Manet the idea of emulating Velasquez's *tour de force*. Had he lived another ten years, it is probable that time and the increase of the Impressionists in numerical strength, would have modified Manet's eccentricities. There is a fascination in being the only one to receive the kicks and stone-throwing of the Philistines; but when the kicks cease and persecution is out of fashion, there is little charm in being one of a herd of ignored eccentrics.

Will Meissonier's reputation last? Will he be looked upon as the first of French painters a hundred years hence? Is he now, by independent thinkers? are questions which time alone can answer. But that he does not hold the unique position he did, must be patent to all. There is a certain hardness about his work, and a want of rich coloring, as may be seen in his pictures now on view; but his "1814" is a fine work in its line. Whether as a painter of military life he equals De Neuville, and whether in the master's peculiar line, his pupil, Détaille, does not run him very close, are queries some of us, who are bold enough to confess it, may answer in favor of the younger men. De Neuville was a better colorist, he put more life into his soldiers, and, above all, he touches our hearts. One looks on at that stolid Emperor returning from defeat, with tearless eyes—even the woes of his victims do not appeal to our hearts, and we feel no more sympathy with them than we do for the exaggerated expressions of suffering upon the faces of Baron Gros's warriors; but when we come upon the "Dernières Cartouches," or the "Parlementaire," we feel all the horror of war, and the agony of the wounded sends a sympathetic thrill through us. Look at that poor chasseur leaning against the bed; observe his sullen and hopeless expression—hopeless, because he can do no more in defence of his country, and sullen because he has only to wait until the enemy enters the house and takes him prisoner with his brave fellows.

Amongst the thirteen Millet's is the "Glaneuses," a far better specimen of color and drawing than the "Angelus," though, of course, not its equal in sentiment, which is the great merit of the latter picture. Indeed, it was upon the "Angelus" that Millet's reputation as a poet was founded. M. Jules Breton is also a poet, who poetizes peasant life, and unlike Millet he is a good draughtsman and a fine colorist; but, as yet, he has not won the suffrages of the world for his numerous "Bretonnes" and his "Pardons"; but, then, we must remember he yet lives, and the public prefers putting

its gold into the pockets of the dealer, than into the purses of the painters.

It is with pleasure I greet once more M. Raffaelli's "Petits Anes," that charming little couple standing upon the weed-grown hill. If only Raffaelli could forego black and dirt, how admirable some of his work would be! Let me, in passing, point out the power of M. Roll's "Vieux Carrier," an old man in a white blouse, and a wondrous piece of handling. Rousseau is represented by fifteen and Troyon by ten works, all worthy of study.

The drawings by Barye, Baudry, Corot, Delacroix, Géricault, Millet and Prud'hon, and the caricatures of Gavarni and Daumier are legion; but we must pass them by, and visit the moderns of the Décennale and Foreign Sections.

The only fault which can be found by a carping critic in the Fine Arts class of the great exhibition is in the arrangement. Perfect masters in organization as the French usually are, they have this time failed to exercise their talents. One finds the same names in the lower rooms on the ground-floor (given up to modern art — a sort of second *Salon*, in fact) and in the first-floor galleries, which are divided into the Décennale and the Centennale. This is confusing as one sees a painter sometimes in one place, sometimes in another, and a few, in all three. A man may be in the modern gallery, and yet not considered worthy of the Décennale, or he may be in the latter, but not form one of the select few in the Centennale. Thus Carolus-Duran is in all three; Delaunay is in the two honored positions, and the deceased painters are only in the Centennale. And the plague of it is that if one wants a catalogue, one has to take two volumes.

Very few persons have had the chance of seeing M. Delaunay's work, for he rarely exhibits; but even to those who know his portraits, such *tours de force* as those of "Général Mellinet" and "M. l'Abbé . . ." are a revelation. The former is a mere sketch, the latter is highly finished, but both are specimens of the finest coloring and technique. It is a pity M. Benjamin-Constant did not send his "Justinian" or his "Théodora"; as it is, we must be satisfied with some nine inferior works (to those above mentioned), although the "Passe-temps d'un Kalife" is by no means anything but a fine scheme of coloring. But broad effects and dashing *coups de brosse* upon a large surface are this painter's distinguishing talents; and, unfortunately, his enormous canvas of the "Justice du Chérif" is one of his least interesting pictures. We hail with pleasure one of M. Bonnat's earliest and best pictures, "St. Vincent-de-Paul prenant la place d'un Galérien." The first time I saw this picture, indeed the first time I became acquainted with the painter's work, was some twenty-three years ago when I was buying something in Messrs. Roberson's shop in Longacre. It had just come from Paris to be sent to some London exhibition, and it struck me as a very powerful piece of work. Since 1866 it has been buried in the darkness of St. Nicholas-des-Champs, whence it has been unearthed for the benefit of a younger generation. M. Carolus-Duran shows us one of those charming Velasquez-toned portraits of children which used to delight our color-sense, as well as M. Pasteur and other fine portraits; but it is in the pink and gray coloring of a fair young child that he excels.

How fine, too, are the little portraits by M. Chartran of MM. Mounet-Sully, J. Story, Ch. Lefebvre and Mme. Lambert, and our old friends: Dullos in the *rôle* of Don Carlos, by M. Comerre, and M. Henry Maret by M. Cormon. MM. Dagnan-Bouveret and Dagnan have most of their best works, the latter's "Moulage sur Nature" seeming to me to have gone off in color. It is curious, and, if one knew the painters' methods, it would be instructive, to watch the effect of time on their work: some seem to be as fresh as when first painted, while others have terribly deteriorated. Of the former class, note MM. Montenard's and Olive's landscapes of the south of France. How exquisitely sunny and light! how full of air and sea-breezes!

A young painter who makes his mark is M. Friant; *médaillé* first in 1884, he is advancing to the front rank. As one passes round the rooms one meets many old friends: M. Geoffroy's realistic school-children, M. Roll's powerful "Miners' Strike," M. Goeneutte's sad Parisian scenes, M. Heilbuth's charming environs of Paris and Roman cardinals, M. Henner's masterly "Fabiola" and "Mon Frère," M. Monvel's eccentricities, M. Morot's "Reischoffen," M. Pille's "L'ami Benjamin-Constant," M. Perret's Burgundian women, M. Puvis de Chavanne's unhealthy and half-starved victims, M. Rixens's portraits of Delsarte and his cello (as fresh as ever), and M. Vollon's incomparable pots and pans.

Of the sculpture, the water-colors and the engravings it is impossible to write — space will not allow me — but, in passing, it may be well to point out that the separate pavilions of the Societies of Aquarellistes and Pastellistes contain some very fine works. Go from that early home of water-color painting, Great Britain, into the French gallery, and see how far greater the work in the latter is. True, in England many artists *only* work in this medium, whereas the French Aquarellistes are mostly painters in oil, which may account for the greater breadth of treatment in their work. But whatever the cause, the result is a certain freedom of touch and strength of handling which one does not find in the work of the London water-color societies. They are not *modern* in their style. An impressionist run riot is M. Ch. Toché, who rejoices in a pavilion all to himself. He is clever, but, to judge fairly of his work, the room should have been six times as long. Possibly the effect of his pictures might be good, could one stand a quarter of a mile from them; but, hung as they are, his canvasses (notably "Washington Irving's Guide of the Alhambra") have the appearance of having been covered with palette scrapings.

It is difficult, and, writing for an American journal, invidious, to class the foreign pictures; but your readers must not think me a flatterer if I say that, after France, the United States seems to me to come out strongest; my own country certainly does not. Some years ago, I predicted that America, as a country with no art history, was doing the wisest thing in going to the most artistic of the Old World nations to educate itself. Since that time our younger Englishmen have done likewise, and with the best results; but, unfortunately, whereas the United States are represented by their Paris-taught men, Great Britain is mainly represented by the old school of uneducated geniuses, such as Mr. Sant and Mr. Goodall. Of course, others have sent — Mr. Orchardson, Sir John Millais, Mr. Alma-Tadema and Mr. Herkomer; but the two latter are not Englishmen, and there is, unfortunately, a very large proportion of weak sentimentality on view. Spain has a fine show, and disputes the first place with the United States; but Spanish art is mainly the work of a few men, whereas from America many hail. But throughout all the foreign section, with the exception of Great Britain and Holland, all that is good shows the influence of France. Holland has a distinctive style of its own, and not a bad one. Great Britain also shows originality and individuality in the work of Mr. Burne-Jones and Mr. Watts, but whether the originality is of a high order is questionable. If Botticelli discovered the highest aims of art, if the world has learned nothing in the way of drawing and modelling since the old Italian's day except what must be unlearned, then Mr. Burne-Jones's art is of the highest order, for he is simply the admiring disciple of the early Florentines. But if the expression of art has advanced since the fourteenth century, if Titian, Velasquez, Tintoretto, Rubens and Rembrandt count for something in the history of painting, then I fear we must look to other exponents than Mr. Burne-Jones. "King Cophetua" may be an "original" picture, but both the king and the damsel must have been painted from choleraic specimens of the human race, or else they are "idealized" in a sense that I cannot understand. Art ought surely to express nature, but no human nature I have ever seen has been of the color of Mr. Burne-Jones's good people.

But to return to the States. Mr. Bridgman seems to have failed to fill the high place which his earlier work promised, though possibly he is not well represented. Mr. Boggs's landscapes or Paris-scapes are always welcome if somewhat sad and damp. Mr. Dannat astonishes us once more with his open-mouthed Spanish singers, "Un Quatuor." Mr. Hitchcock has exhibited his "Tulips," "Maternité" and "L'Annonciation," a semi-realistic, semi-ideal treatment of an old, world-worn subject. The Blessed Virgin stands as a peasant girl, with a faint *nimbus* behind her head, looking down upon a garden of lilies, from which she learns the angelic message. It is a poetic picture, and certainly an original one, without a spark of eccentricity or clap-trap. True to the life are Mr. Humphrey Moore's Japanese views, but they are not seen through Japanese spectacles, as are so many similar works of European painters. Mr. Pearce's "Bergère" reminds me that his French artistic cousin, M. Lerolle, is not represented in the exhibition, which is a pity. Mr. Sargent's three Velasquez-like children are here, and make one wish that he would return to his early manner. His "Lady Macbeth" was a magnificent bit of color, and many of his late portraits are marvellously lifelike; but for breadth and strength gained without effort, perhaps his three children and their surroundings are his best effort.

M. Madrazo is a Parisian Spaniard, but his work has a certain freshness and grayness that recalls his great compatriot, Velasquez. Few moderns could put together such a harmonious piece of coloring as his Duchesse de Lécera in pink or his Mme. Saly Stern in white; but the painter should guard against a certain tendency towards the coloring of china and enamel painters. M. Aranda is another master who is an honor to his country, both in oil and water-colors; and although M. Martin Rico's views of Paris, Rome and Venice resemble each other rather too much, they are full of light and air.

Germany has very few works, but the few are good. Every one who sees the *Salon* knows the work of MM. Kuehl, Uhde, Leibl, Stetten, Heffner and Liebermann, and the same remark applies to Austria-Hungary. M. Axentowicz's portrait, M. Ernst's "Gardien au Caire" (Pasini-like in its style), M. Pettenkofen's little "Marchande de Volailles" and "Le Marché au Chevaux — Hongrie" are all gems in their several manners. Here, too, we renew our acquaintance with M. Munkacsy's greatest work, the "Christ before Pilate," and those weird and touching pictures by M. Payer of the death of Franklin and his brave companions. Landscapes by MM. Ribarz and Jettel, and the "Veuve du Pêcheur" by M. Schlomka, are also noteworthy.

Amongst the Belgians, the most notable are the "Passage d'eau," the "Vieille Lys" and the "Pic Nic," by M. Claus, who has found out the secret of reflecting light onto his canvas; some marvellous Holbeinesque work by M. Van Hove, "l'Alchimie; M. Verhas's "School Parade" and M. Courtens's "Retour de l'Office."

Great Britain is not well represented, but, besides those already mentioned, one must cite the works of Messrs. Moore, Hook, Forbes, Clausen, Gregory, Hacker, Parton, and the fine portrait, by the late Frank Holl, of Sir H. Rawlinson, Mr. Ouless's "Cardinal Manning"

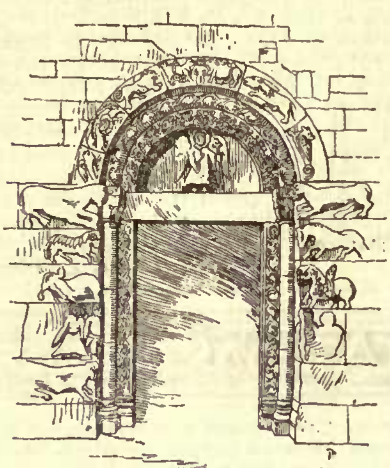
and Mr. Shannon's "Mr. Henry Vigni." It may be interesting to note that some French painters think very highly of Mr. Burne-Jones's work, and that the generality consider the British section interesting from the point-of-view of individuality. Certainly this is true of a few of the English painters; whether for better or worse they are themselves, and unlike any one else. But whether the originality is gained at the sacrifice of other qualities is a question. Originality is not everything.

In the Dutch section we find Artz, Bisschop, Israels, Kaemmerer, Gabriel, Maris, Mesdag, Klinkenberg and Vos; and in Russia, Harlamoff, Endogouroff, Chelmonski, Lehmann, Loevy, Pan-Riewicz and Marie Bachkirtzeff.

Sweden contains the works of Bergh, Hagborg, Pauli, Meinthe, Wahlberg, Traegaardh and Zorn; Norway, Munthe, Normann, Smith-Hald and Skredsvig; Switzerland, Bieler, Giron and Ravel.

Even the South American Republics, Roumania, Servia, Hawaii and other obscure countries exhibit and are acquiring knowledge at the fountain-head, so that in another ten years we may expect to see many more shining lights. Penguin.

FLORENTINE *PIETRA DURA* OR MOSAIC WORK.



DOOR OF THE CHAPEL OF THE CHÂTEAU-TYROL AT MÉRAN AUSTRIA

HER Majesty's Consul-General at Florence says that the proper technical term for the so-called Florentine mosaics is works in *commesso.* They are composed of delicate slices of stones, carefully cut into shape, arranged and joined together (*commessi*) with a fine cement, and then fitted into a thin slab of marble. The pictures are produced by the natural tints of the stones, the selection of which require great taste and skill. Works in *commesso* are executed in the following manner: After the design has been prepared, the thin slices of stone selected for the various parts are distributed among a certain number of workmen, each of whom completes the portion of the design entrusted to him, the whole subject being subsequently united. The stones, after being cut into the required shapes, are carefully set together with a cement made of wax and mastic (*pece greca*), heat being used to bind them together. Slate is employed to support the work during its progress, and to line it when complete. At each stage the first lining affixed to the separate parts is ground down and a fresh one affixed, so that an even surface may always be secured. When the complete design is fitted into the marble slab prepared for its reception, the whole of the base is again ground down to a perfect plane, and is lined with a fresh backing of slate. The fitting is performed with the greatest care, the edges of the several parts being filed until the exact dimensions have been attained. The whole surface is afterwards polished, so that the lines of juncture are rendered almost invisible. To bind on the lining heat is used, as also for uniting the smaller pieces. The operation is very carefully performed, so that no more cement than is absolutely required should remain between the parts that have been joined together. The first operation of sawing the stones into thin slices, from two and one-half to three millimetres in thickness, is performed by means of thin blades of iron or copper, emery powder giving the required friction. The slices are farther sawn into the shapes required to form the various parts of the design by iron or copper wire attached to bows, and always with the aid of emery. The finest emery powder (*poltiglia*) is used for polishing the surface of the stones, and emery is employed for grinding down the linings. For this purpose the work is placed on a fixed slab of marble or slate, iron plates of various sizes and thicknesses, according to the dimensions of the slab, and having wooden handles, being steadily worked over it by one or two men, as required. Sir Dominic Colnaghi says that it would be interesting to trace the origin of this art, and to follow its development from Classic times, through Siena to the present style of work, which began to be practised about the middle of the sixteenth century.

Portraits, landscapes and architectural views were first produced, but it was soon felt that these subjects were unsuited to the materials employed. Decorative designs and imitations of fruits and flowers, therefore, took their place, and form the most successful subjects of modern works executed in *pietre dure.* It has been doubted whether the introduction of the art of working in mosaic into Florence, under the patronage of the Grand Dukes of the house of Medici, is due to Tuscan or Lombard artists, as it would appear to have flourished contemporaneously in both regions. While, however, it has died out — or nearly so — in Lombardy, it has survived in Tuscany, to become an important branch of Florentine industry. To provide stones for the works in real *pietre dure,* Europe, Asia and the North of Africa have been laid under contribution, and the Royal Factory possesses a large collection of stones valued at some 20,000 lire. Among the principal stones employed are amethysts, agates, the sardonyx and chalcedony, flints and many varieties of jasper, pebbles from the Arno (which generally contain a large proportion of lime) and petrified woods. Among the rocks which are chiefly used for works of decoration are red Oriental, Egyptian and other granites, *verde di Corsica,* labradorite, antique porphyry, green porphyry, Oriental serpentine, jade, basalt, silicious Breccia and *lapis lazuli.* Black marble from Belgium is largely used as a foundation, and slate, as has already been mentioned, is employed as a lining for works in *commesso.* The hardness of the materials employed, requiring patient industry to work them, accounts for the costliness of works in *pietre dure,* of which 75 to 80 per cent is attributed to labor. The commercial articles met with in the Florentine shops are chiefly composed of the softer qualities of calcareous stones, while shells are used for the white and pink tints, and coral is occasionally inserted. The workmanship, design and effect are often excellent, but they are able to be produced at much less cost than the works executed at the Royal Factory, of which the following is a short notice: Although artists in mosaic had been employed by Duke Cosmo de Medici in previous years, the foundation of the Royal Factory of *pietre dure* in Florence may, perhaps, be considered to date from about the year 1754, when some rooms in the Casino di San Marco were assigned for the residence of the masters of the art. The factory was principally founded to carry out the works of the great sepulchral chapel of the Medici in S. Lorenzo. This chapel would appear always to have been intended to receive the monuments of the princes of the House of Medici, and never, as tradition avers, to become the receptacle of the tomb of our Lord, which was to have been conveyed to Florence from the Holy Land by the Druse Emir Faccardin (Fakhr-ed-Din). The slow progress of the chapel enabled the artists employed in the factory to execute other works, which were presented by the later Medici princes, on different occasions, to foreign sovereigns, thus extending the reputation of the factory. Some of the artists appear to have tried their fortunes in foreign lands, and it is thought that a part, at least, of the works in *pietre dure,* executed in the Taj Mahal of Agra, are of Florentine origin. In 1723 a small factory was founded at Naples, which existed until 1860, when it was suppressed; but no rival rose to compete with Florence until the establishment of the Imperial works at St. Petersburgh for mosaic in relief, about the year 1840. The mosaics executed in the factory of the Vatican, at Rome, are of an entirely different character from the Florentine works in *commesso.* On the overthrow of the Grand Ducal Government in 1860, the works of the Medicean chapel were suspended until the beginning of 1883. Since this date about 135 square metres of the pavement executed in *commesso* on a large scale have been completed. The total area of flooring of the octagon, excluding the recesses, is 642 square metres. The completion of the chapel has been entrusted by Ministerial decree to the Royal Factory. The total cost up to the present time is estimated at 16,300,000 lire, or £625,000. The average annual value of the production of the factory is calculated at 52,000 lire, of which about 12,000 represent works sold in Italy and abroad on private commissions, and the remainder in part works placed in the museum of the factory and partly repairs in mosaics, etc., existing in the Royal Galleries of Florence, from which the administration of the factory now depends. The works executed are marble table-tops, panels for furniture, caskets, letter-weights, decorated in *commesso,* both flat and in relief, vases, cups, statuettes, columns and other ornamental works. At the present time, says Consul-General Colnaghi, a large piece is being executed, combining all the different kinds of works — *commesso, intarsio,* relief and in the round. The work consists of a large black vase, richly decorated with flowers, fruit, birds, etc., and is the first example of *commesso* work applied to a curved surface. All the work is carried on by hand; there is no machinery, though this is much needed, it is said, in the sawing-department. For about two centuries and a half the production of the Florentine mosaics had remained a monopoly of the Royal Factory, it was not till 1825 that there was an industrial application of the art to small articles of jewelery and ornaments. To effect this, however, the true *pietra dura* had of necessity to be put on one side, and its place taken by calcareous stones and shells, thus allowing the work to be executed at reasonable rates. Between 1863 and 1873, the period when the city was the capital of Italy, there was especially a considerable increase in the industry. Since 1873 a variety of causes — such as the removal of the capital, the cholera (which caused a temporary diminution in the number of visitors to Florence) and changes of fashion — have led to a decrease in the production. The outfit of a mosaicist is very simple. With a small table, a basin of water, a brazier, a vise, some copper and iron blades to be used as files, a bow strung with iron wire, a little emery powder and a few stones already cut into slices, which cost only a few francs, his equipment is complete. — *Journal of the Society of Arts.*

St. Martin's, Ludgate, London. — Still another of Sir Christopher Wren's fine old London steeples is doomed to destruction, that of St. Martin's, Ludgate. The *London Athenæum* is moved to make a vigorous remonstrance against it, specially for the reason that in all probability Sir Christopher designed this steeple with reference to its effect as seen in proximity to the massive dome of St. Paul's, just beyond.

SOCIETIES

AMERICAN INSTITUTE OF ARCHITECTS AND WESTERN ASSOCIATION OF ARCHITECTS.

IN accordance with the preliminary notice of September 19th, the Convention of the American Institute of Architects and Western Association of Architects, for the consummation of consolidation, will be held at the Burnet House, corner of Vine and Third Streets, Cincinnati, Ohio, opening on Wednesday, November 20, 1889.

FIRST DAY.

The Western Association of Architects will be called to order at 10 A. M., precisely, by its President, Mr. W. W. Carlin, who will make the annual address, to be followed by the presentation of reports.

The same routine will then be pursued by the American Institute of Architects, its President, Mr. R. M. Hunt, making the annual address.

The reports of both societies will be held for reference to the incoming Board of Directors.

The proposed new Constitution and By-Laws will then be presented for discussion and adoption.

Immediately after adjournment all members will lunch at the Burnet House as guests of the Association of Ohio Architects, and a drive will then be taken through the suburbs. Should the weather be unsuitable, the drive will be postponed until the next day.

There will be no business transacted during, nor stated entertainment provided for, the evening.

SECOND DAY.

Opening at 10 A. M. precisely.

Further discussion of proposed Constitution and By-Laws, and, on adoption of the same, the Convention will in such manner as it may determine proceed to nominate and elect the new Board of Officers, etc.

Miscellaneous business and the reading and discussion of papers will be in order during the Convention, but not to take precedence of the above-mentioned order of business.

Lunch as on previous day.

The Burnet House has been selected as the headquarters for members attending the Convention, as well as for the place of meeting. A uniform rate of $3.50 per day has been made by the management, who have guaranteed that first-class entertainment shall be given.

Immediately on arrival at headquarters each member will please register, and receive a *souvenir* button to wear during the Convention.

Those intending to be present will please notify Mr. Crapsey at Cincinnati, so that the Local Committee may know how many to provide for.

On the evening of the 19th (the day preceding the Convention), a reception will be given by the Cincinnati Architectural Club in Pike's Hall, where the National Exhibit of Architectural Drawings will be held, and to which reception and exhibit all visitors are cordially invited. This exhibition is intended to be the largest and best of its kind ever held in this country. Responses have been received from all the best offices in the country, and it will without doubt be an occasion of the greatest professional interest, and will be well worthy of an especial visit.

The exhibit being conducted by the Cincinnati Architectural Club, drawings should be sent directly to them.

Railroads included in the territory of the Central Traffic Association and the Trunk Line Association, except the State of Michigan, will carry passengers coming to the Convention at usual full rates, but will return all such at one-third full rate. This does not apply from New York City, either the New York Central & Hudson or Pennsylvania Railroads.

The territory within which the return fare will be granted includes the States of New York, Pennsylvania, New Jersey, Delaware, Maryland, Ohio, Indiana and Illinois, except the portion northwest of a line from Chicago to Quincy.

Those living in New England should purchase tickets to Albany or New York, and at one of these points buy through to Cincinnati, taking a certificate of the ticket-agent at Albany or New York.

Those coming from the Northwest should buy tickets to Chicago, Quincy or St. Louis, or some other point within the territory of the Central Traffic Association, at which points they can secure certificates entitling them to the reduction in return rate.

Purchase your tickets at least thirty minutes before leaving time.

In order to secure a reduction of rates, it will be necessary to follow strictly the following instructions:

First. Each person must purchase (not more than three days prior to the date of the meeting, nor later than three days after the commencement of the meeting) a first-class ticket (either unlimited or limited) to the place of meeting, for which he will pay the regular tariff fare, and upon request the ticket-agent will issue to him a certificate of such purchase, properly filled up and signed by said ticket-agent.

Second. If through tickets cannot be procured at the starting point, the person will purchase to the nearest point where such through tickets can be obtained, and there re-purchase through to place of meeting, requesting a certificate properly filled out by the agent at the point where re-purchase is made.

Third. Tickets for the return journey will be sold by the ticket-agents at the place of meeting at one-third the highest limited fare only to those holding certificates signed by the ticket-agent at point where through ticket to the place of meeting was purchased, and countersigned by the secretary or clerk of the Convention, certifying that the holder has been in attendance upon the Convention. All certificates must be signed by Normand S. Patton, Secretary Western Association of Architects.

Fourth. It is absolutely necessary that a certificate be procured, as it indicates that full fare has been paid for the going journey, and that the person is therefore entitled to the excursion fare returning. It will also determine the route *via* which the ticket for return journey should be sold, and *without it no reduction will be made*, as the rule of the Association is that "No refund of fare can be expected because of failure of the parties to obtain certificates."

Fifth. Tickets for return journey will be furnished only on certificates procured not more than *three days* before the meeting assembles, nor later than *three days* after the commencement of the meeting, and will be available for continuous passage only, no stop-over privileges being allowed on tickets sold at less than full fares. Certificates will not be honored unless presented within *three days* after the date of the adjournment of the Convention.

A. J. BLOOR, Secretary, A. I. A.,
N. S. PATTON, Secretary, W. A. A.,
E. H. KENDALL,
CHAS. CRAPSEY,
Committee of Arrangements.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

FREMIET'S STATUE OF JOAN OF ARC.

PHILADELPHIA, PA., November 2, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs. — It may interest your readers to know that Fremiet's last statue of Jeanne d' Arc has been purchased by this Association and is now being cast. The bronze will arrive in this city the beginning of next year and will be unveiled with appropriate ceremonies under the direction of the French societies in this city.

This Association has given permission to M. Fremiet to have a replica made for his native city of Nancy. This will be the only one allowed.

M. Fremiet has made a modification in his new statue, namely, the tail of the horse instead of being a "bob tail" has a knotted and tied tail, similar to the "Colleoni."

Your article is in error in saying that M. Fremiet is past the prime of life. He is still comparatively young and full of vigor. His last groups at the Paris Exposition show that his powers have in no way abated. Yours truly, THOMAS HOCKLEY,
Chairman Committee Works of Art, F. P. A. A.

[THE writer of the articles desires to congratulate the Association on the success that has attended its judicious enterprise. The sculptor, though still hale and hearty, was nevertheless born in 1824, and as he is thus within five years of the Biblical limit of life he may be fairly considered as "long past the prime."]

NOTES AND CLIPPINGS

THE CHICAGO AUDITORIUM. — The foundations of the tower cover 69 by 100 feet, and were specially prepared to receive the weight of 15,040 tons, or about 4,350 pounds per square foot, which was to be imposed upon it. The foundation was excavated to the clay layer on which all Chicago buildings are founded, and on this was built a timber grillage 2 feet thick. On this as a foundation, there was laid a layer of solid concrete, 5 feet thick, and to prevent any unequal settlement of this mass, and distribute the weight equally to all parts of the foundation, there were embedded in the concrete three layers of railway rails, one layer of 15-inch V-beams, and one layer of 12-inch I-beams. But even after these precautions, in view of the well-known compressibility of Chicago clay, it was feared that the great excess of pressure in the tower over that in other parts of the structure might carry the whole tower foundation down and cause cracks in the masonry at the points where the tower walls joined those of the main building. To guard against any possible defect of this sort the architects adopted the expedient of loading the tower foundation with a weight approximating to what it would

have to carry when completed, which weight was gradually removed as the tower walls were carried up above the main structure. Thus far the expedient seems to have been entirely successful and the tower shows no signs whatever of further settlement. Among other noticeable feats of engineering accomplished in the structure were the carrying over the stage of four stories of rooms and two stories of iron rigging-lofts, These are supported by four iron trusses, each having a clear span of 110 feet. The banqueting-hall is carried over the auditorium room by two iron trusses, each of 120 feet span. Besides a great number of offices, the building will contain a hotel, with 400 rooms for guests, and the great auditorium, one of the largest public halls in the country, having a seating capacity of 5,000, which can be increased to 9,000 by throwing the stage into the hall and making extra provisions for the crowd. During the Republican National Convention a year ago there were 11,000 persons in the hall at one time. The whole stage machinery is operated by hydraulic power, as are also the elevators in the portion of the building devoted to offices. There are nine passenger and four freight elevators supplied from tanks on the fifteenth story of the tower, with a capacity of 28,000 gallons. An artesian well, now down to 1,200 feet, will supply the hotel with water. The plumbing work throughout has been supplied with ventilating pipes leading to shafts up which the air is drawn by fans. — *Engineering News.*

Properties of Quicksand. — The properties of quicksand are thus described in the *Mechanical News:* The difference between building sand and true quicksand is most easily explained by comparing building sand to road metal, while the quicksand must be represented by fragments no larger than large buckshot, but shaped like very smooth potatoes. In a word, the quicksand is small and thoroughly waterworn so that every fragment has been deprived of all its angles and fairly well-polished. Its particles are very small as compared with those of the building sand. The smaller the size and the more complete the rounding the more nearly will the sand approach a liquid condition when it is moistened. The first glance at a fairly mounted sample of quicksand under a microscope is sufficient to show that the quickness of the sand is amply accounted for by the innumerable friction wheels which the particles themselves furnish. Sharp or building sand, on the other hand, will show few round corners, many angles, corners, and a general condition like that of broken stone. Sea sand is often unfit for building, even though perfectly deprived of its salt, the reason being that the particles have been worn and polished till they have no more binding powers than so many cobble-stones. It is well to remember that quicksand when dry, if very fine, shows the same properties as a liquid. In holding up the centres of large bridges it is sometimes put into cylinders with a plunger on top of it. It will, when thus confined, hold up the load like a column of water, When it is desired to strike the centres a plug is drawn out of the side of the cylinders, and the sand flows out like so much water. The advantage, of course, is that the sand does not need a packed piston and does not leak out, though the work be prolonged for years. Quicksand when dry and confined forms an admirable foundation, and when wet can be loaded over its whole surface, and give a good support if side openings can be avoided.

Fall of a Neapolitan Palace. — "The disused cisterns of the Naples palaces, when not filled up, are becoming a peril to the city," writes a Naples correspondent of the *London Daily News.* "Whether full of stagnant water or empty," he says, "they are equally uncared for, never re-cemented, and the consequence is that their walls crumble, or the water gradually saps the foundations of the palaces. The frequent bursting of the defective tubes of the new water-works is another source of danger and, consequently, scarcely a week passes without part of some building giving way. Recently, a wing of the fine Palace of St. Severo fell to the ground. It was built early in the sixteenth century by the Prince of San Severo, and restored in the middle of the next century. In 1590 it was the scene of a tragic murder. On the 18th of May of that year, Carlo Gesualdo, the third Prince of Venosa and eighth Count of Consa, murdered his wife in one of its rooms. The many inhabitants of the various floors were saved from a horrible death by a strange accident. The palace door-keeper, taking a sudden fancy for eating a melon at midnight, went down into the cellar to choose one, and noticed the sound of stones continually falling into the disused cistern. Alarmed at this, he opened the door leading to the cistern, and saw that large stones, evidently belonging to the foundations of the palace, were continually falling. At once realizing the danger, he called the *pompieri* and authorities, who ascertained that the water was more than six feet above the usual level, and that it had soaked all the sustaining arches of the left side of the palace, in which large cracks and apertures had appeared. The inhabitants of the palace were roused from their sleep and forced to fly. There was no time to save anything, and, half-dressed and frightened to death, the families, most of whom belonged to the aristocracy, took refuge in neighboring houses. At 5.30 A. M. all were safe, and immediately afterward the firemen were sent away for a little rest, having been at the work of inspection since midnight. Not ten minutes after they had left the palace a frightful crash was heard, and the neighboring houses were shaken. The whole of the left wing of the palace, five stories high, had fallen into the abyss opened by the subterranean water, carrying with it the furniture and valuables. Nothing was saved; nothing had been excavated two days after the catastrophe. The principal sufferers are the Prince of Caramanica and the Duke of Mirelli. The former has all his furniture and the jewels of his wife under the ruins. The latter has lost 150,000 francs in money and securities. The Chapel of San Severo, which contains a famous statue of Christ and others, and was joined to the palace by an archway, is so much shaken that it will be, perhaps, necessary to remove the works of art it contains. This accident has aroused great excitement in the city. The Prefect, Syndic and authorities are indefatigable. Signor Pergara, one of the sufferers, an engineer, has written a letter to the papers, in which he justly demands that a careful and thorough examination of all the buildings of the city should be made, section by section. No one feels safe from a similar mishap. The number of palaces propped by wooden supports, even in the best streets, is very great; every day floors fall in, and loss of life is frequent."

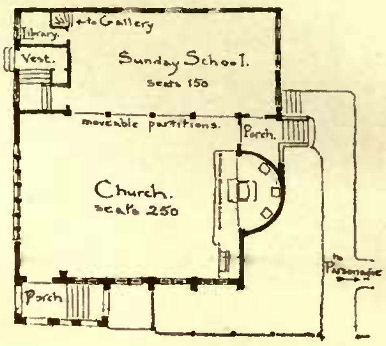
Artesian Borings in Dakota. — The Dakotas are believed to possess the most remarkable artesian belt in the world. There are at least 50 deep wells in the two Dakotas, most of them in the South State. Their depth will range from 450 to 900 feet. The pressure is the most notable fact yet developed. The lowest known is 125, and it runs up to 200 feet. The streams are from 4½ to 6 inches in volume. Such a power and volume is unknown elsewhere. The height of these ranges from 100 to 200 feet. The majority of these wells are so far found in a belt of country at least 50 miles east and west and 400 north and south. But there are good artesian wells all along the line of the Northern Pacific Railroad as far west as Helena, where there is one at the altitude of 4,400 feet, which, from the depth of 900 feet, supplies 00,000 gallons of water every 24 hours. In the Red River Valley, the northeast section of Northern Dakota, there is another remarkable belt of subterranean water, which flows to the surface when tapped at depths of from 50 to 200 feet. Farther south, in the section known as the Coteaux of the Missouri, there is a series of shallow lakes or lagoons, which it is believed from their altitudes may be readily transformed into large and small storage basins. — *Iron Age.*

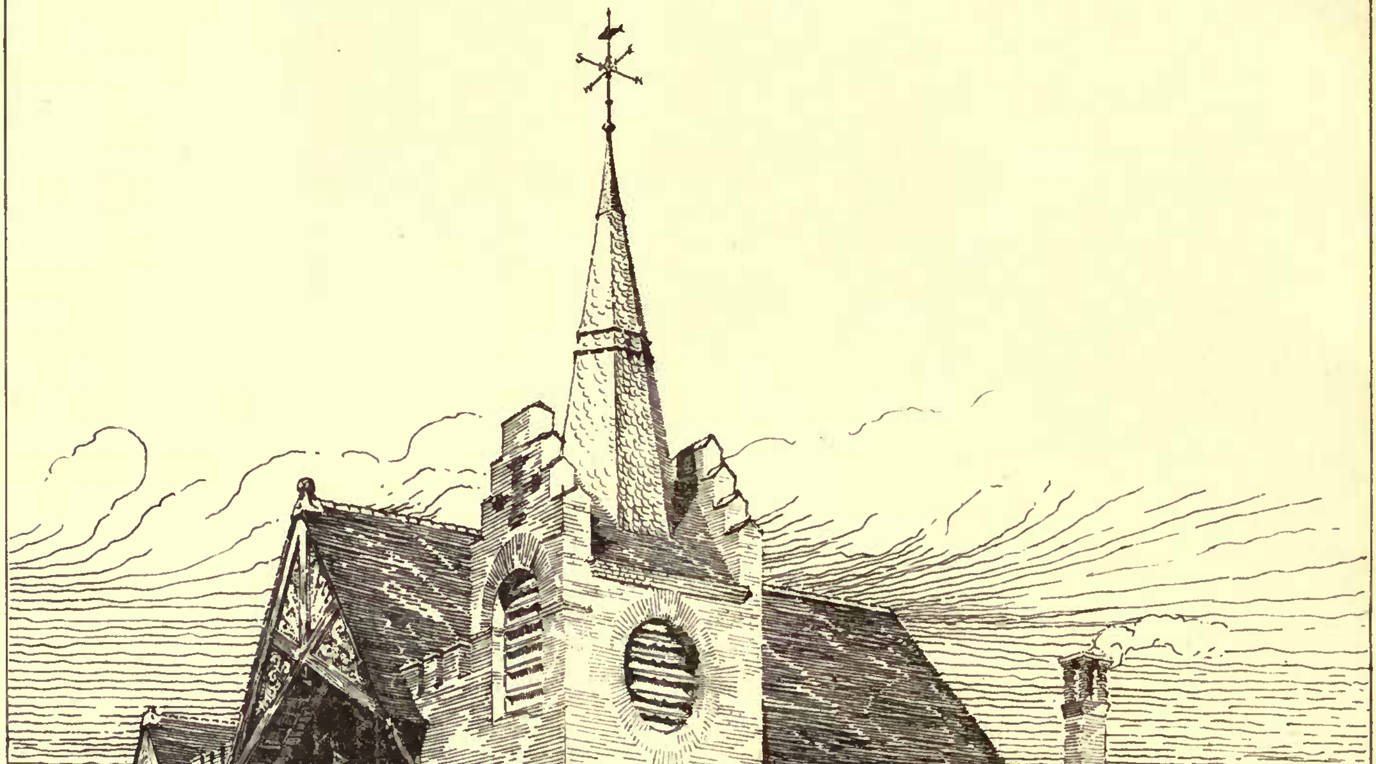
TRADE SURVEYS

A few financiers who are credited with more foresight than many others have unintentionally given out recently that if railroad matters are harmoniously adjusted — whatever that may mean — there will be a boom in railway material of all kinds, and activity in this direction will stimulate activity in many others. It is not necessary to comment largely upon this prediction, as the prophecies of financiers and railway managers are not likely to be of more value than those of ordinary business men. In this particular instance, however, it might be well to note the strong probabilities of such a result. In the first place, an immense amount of capital has for years been kept out of railway investments, because too much mileage was built, too much projected, and such incessant rate wars and disturbances that stockholders and investors, at home and abroad, turned their backs and left it to the railroad companies to fight out their own salvation. From recent indications, it is probable that an adjustment of railway difficulties is near at hand. The trans-Continental understanding is the entering wedge. The immense volume of traffic is making harmony possible, and it is probable that this heavy volume will continue through the winter. Already, Wall Street is stirred with schemes for heavy railroad-building, and not a few of the schemes are well backed. The country can stand more railway construction, and capitalists will probably have a chance to invest their millions in that channel before very long. Another feature deserving of passing mention, is the increasing activity in British and Continental markets of all kinds. Crude-iron has just advanced in Scotland; stocks are declining. Continental iron markets are very active. The small manufactories and shops in Great Britain are crowded with work; ship and marine engine-building is employing more labor than ever before. All branches of industry are thriving. Colonial developments are attracting a great deal of British capital, labor and enterprise, and new markets for British products are being developed. Political economists and writers upon economic questions do not apprehend a speculative advance in any direction, but they are not always wise enough to see below the surface of things. There is some danger of a speculative advance in prices. The facts to be kept in mind are these: Demand is pressing closely on the heels of supply, and in many directions buyers of raw material are placing contracts for delivery of material, beginning January 1, and running three or four months ahead; this is the basis of the upward tendency. It is necessary to keep very close to facts, lest mere theorizing might befog the mind, and suggest conclusions out of accord with practical experience.

There is an extraordinary demand for everything in the shape of tools and machinery. The machinery-makers, large and small, have not been as crowded with work for years as they now find themselves. Locomotive-builders are as busy as during the phenomenal activity of 1882. The makers of hydraulic machinery, heavy machinery for mining and mill purposes, have a rush of orders that will keep them busy until April. The development of new mining properties in the West is attracting a great deal of capital and labor, and creating a demand for an enormous amount of machinery. The machine-shops of Chicago, New York and some localities in New England are full of work for from six to twelve months. The lumber manufacturers are preparing for the busiest winter they have ever known. Stocks of lumber are light everywhere, considering the heavy distribution that has been going on all through the season. Our New England boot and shoe manufacturers are having an excellent autumn trade, and all of them are putting their establishments in order for a heavier output. The electrical-machinery makers are very busy. The coal-producers are beginning to feel the heavier demand incident to the approach of cold weather. The anthracite production is two and one-half million tons below the output to this date last year. The Western mines are producing more than usual. The production of artificial and gaseous fuels to take the place of natural fuel is growing rapidly. Pipe-line laying is being pushed much as railroad construction was pushed seven years ago. The house-building season will soon be over, and the records for the year, when made up fully, will show an excess of twenty per cent over last year, according to reputable authorities. The danger which it is necessary for the rank and file of business men to guard against is that of rushing into an undue anticipation of requirements. If cool judgment can be maintained, the producing capacity will be equal to the emergency. If good judgment be cast aside, prices can be run up to a point that will prove disastrous. This threatened advance will not affect all branches of industry or trade, and those which do not share in it would be seriously injured by the increased cost of raw materials which would be indirectly brought about. These dangers, however, are pretty clearly recognized, and the recognition of them wards off most of the possibility of the advance. The extraordinary expansion of capacity through improvements and additions of new machinery and power of all kinds will in due time equalize the forces at work, and protect both the producing and consuming interests against sudden fluctuations and irregularities in prices.

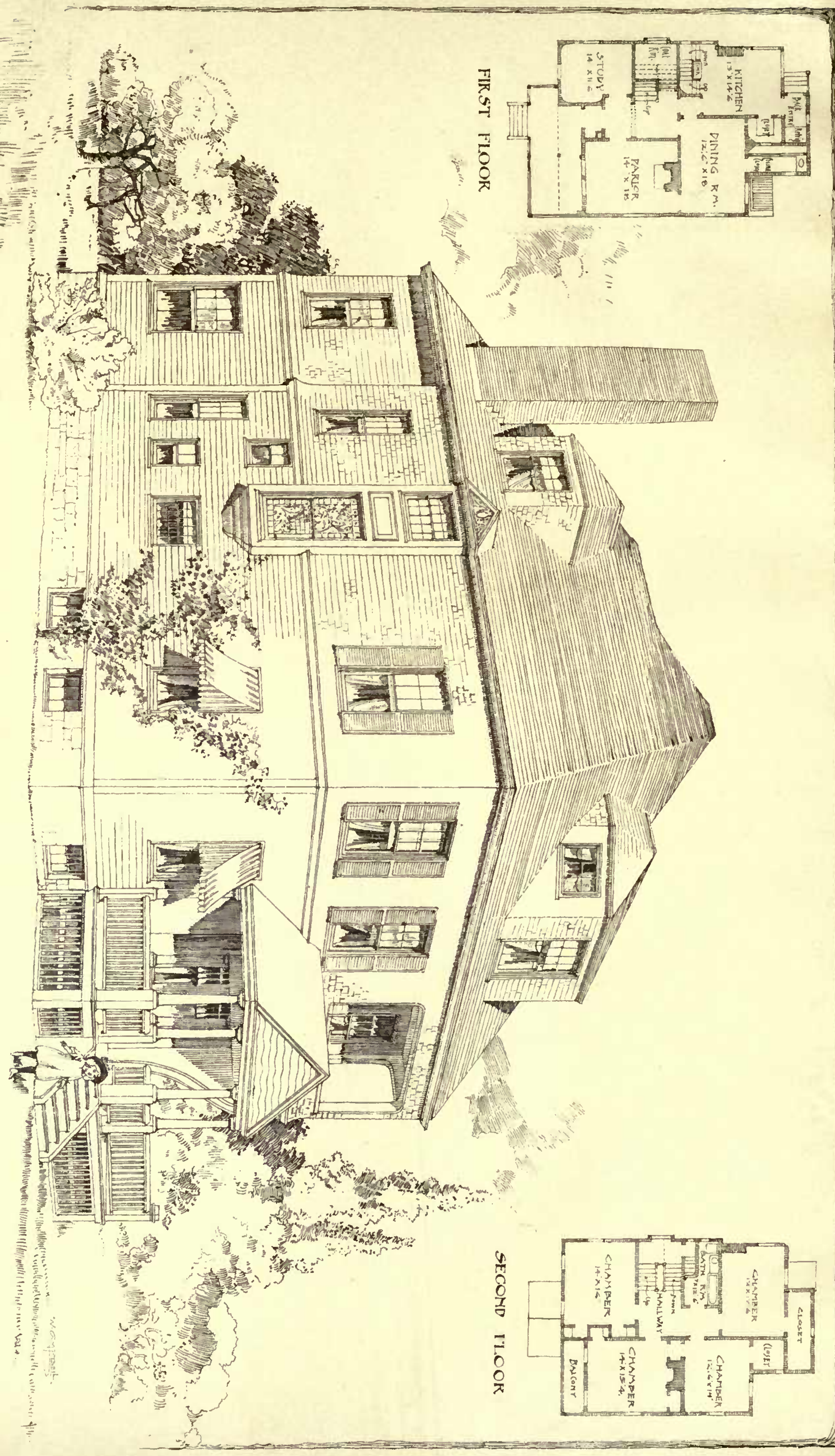
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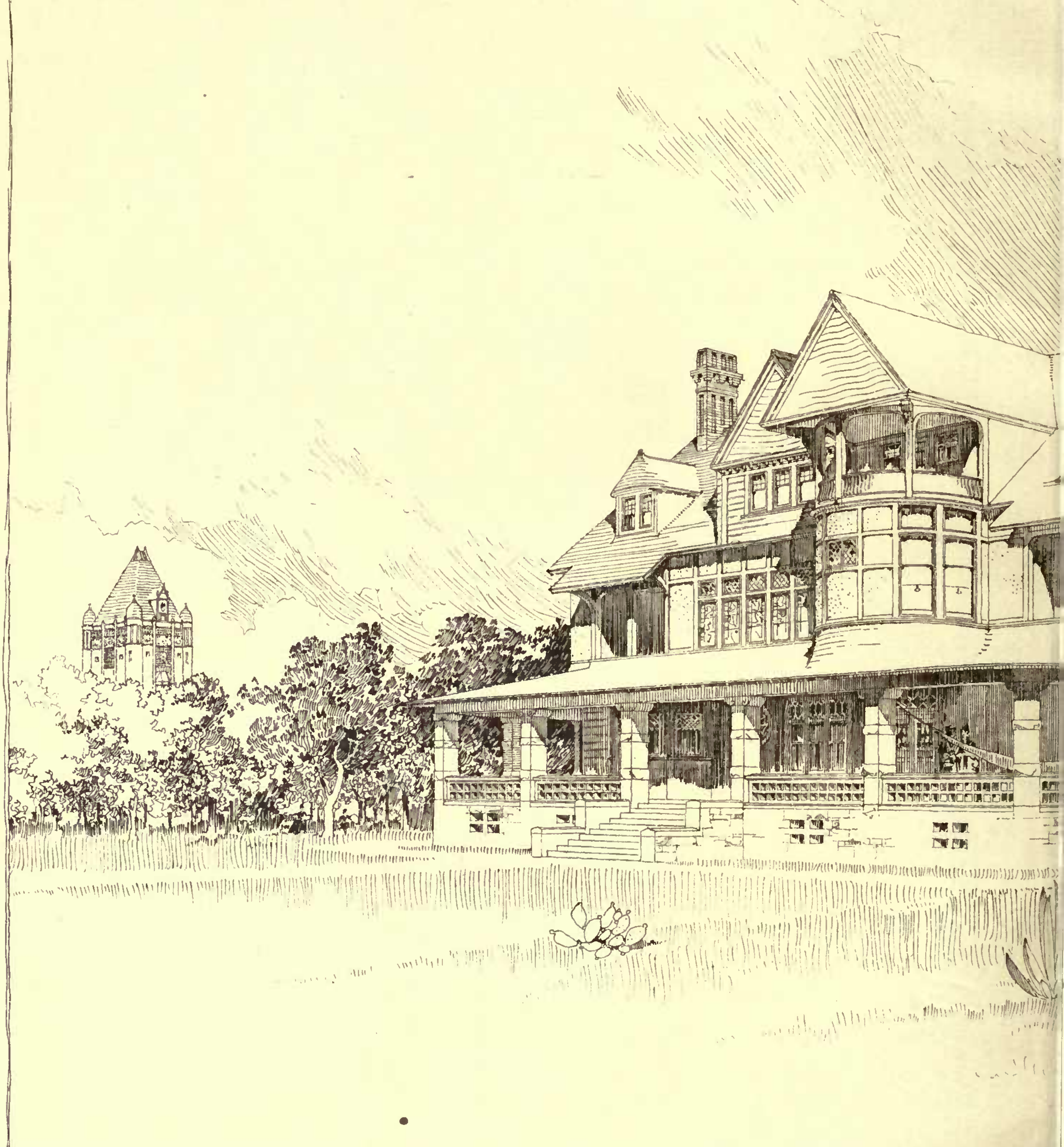
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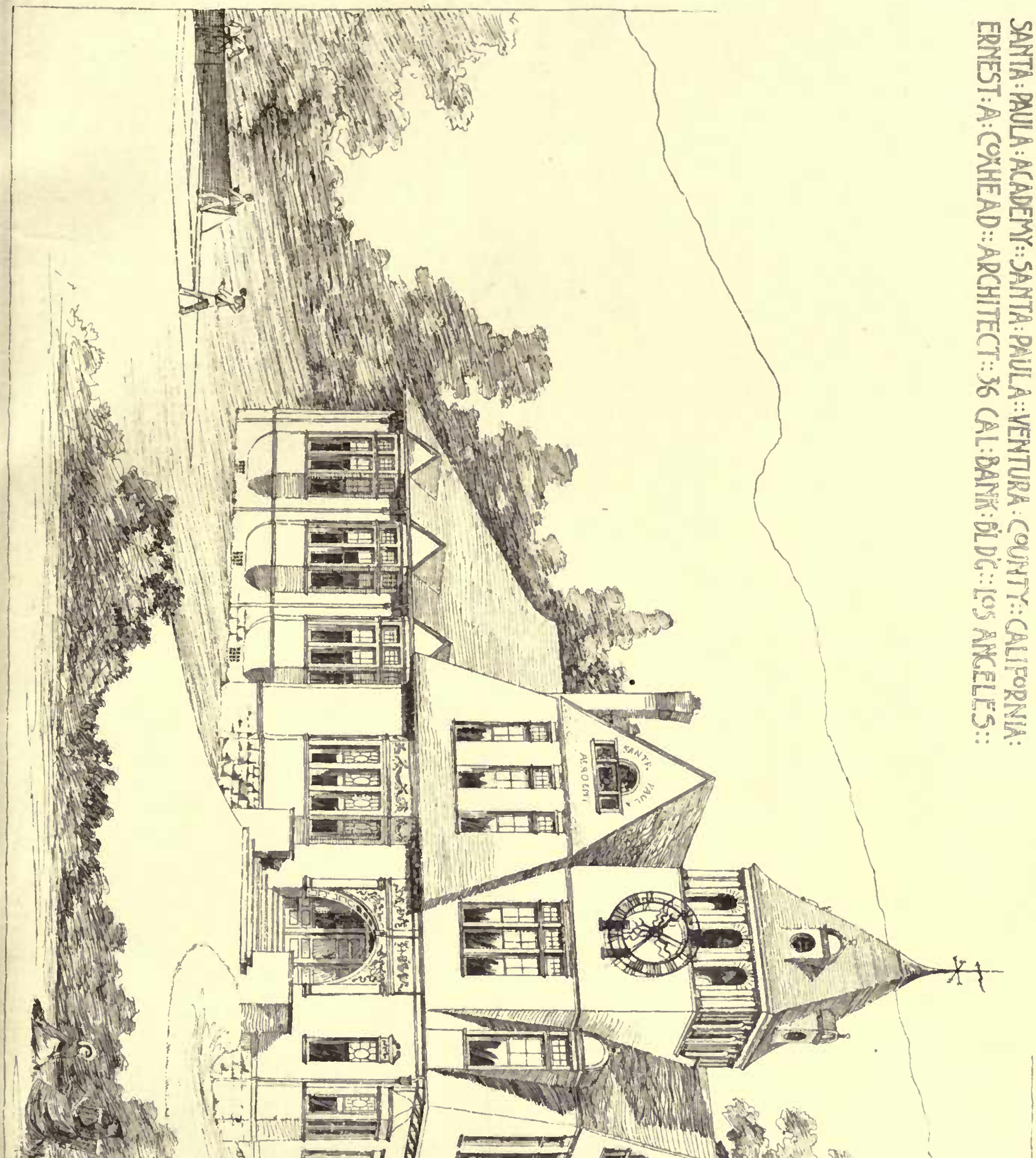


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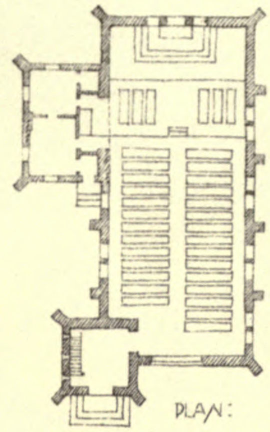
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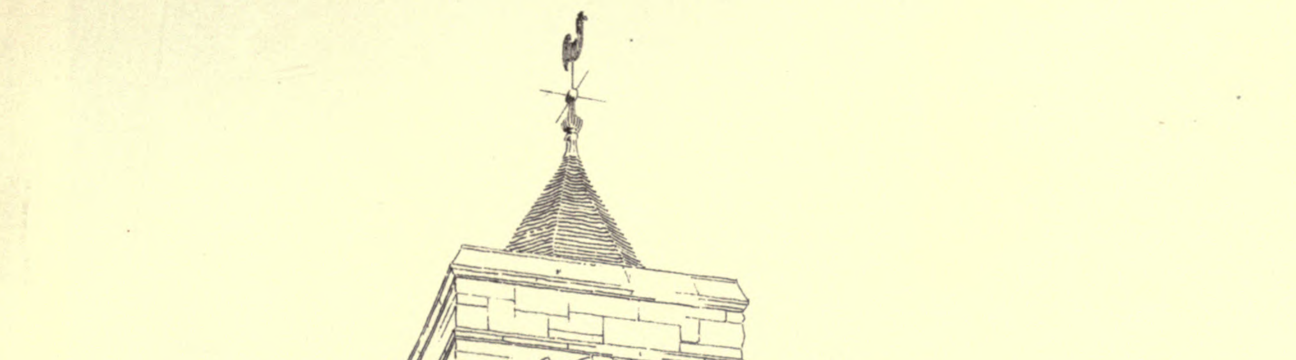


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CHURCH OF THE ATONEMENT
EDGEWATER ILL.
HENRY IVES COBB: ARCHITECT: CHICAGO:

The American Architect and Building News, November 9, 1889. No. 724.

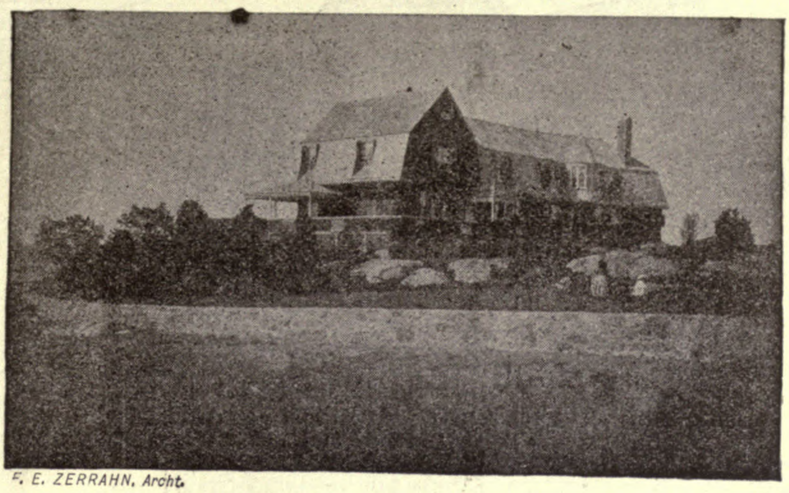


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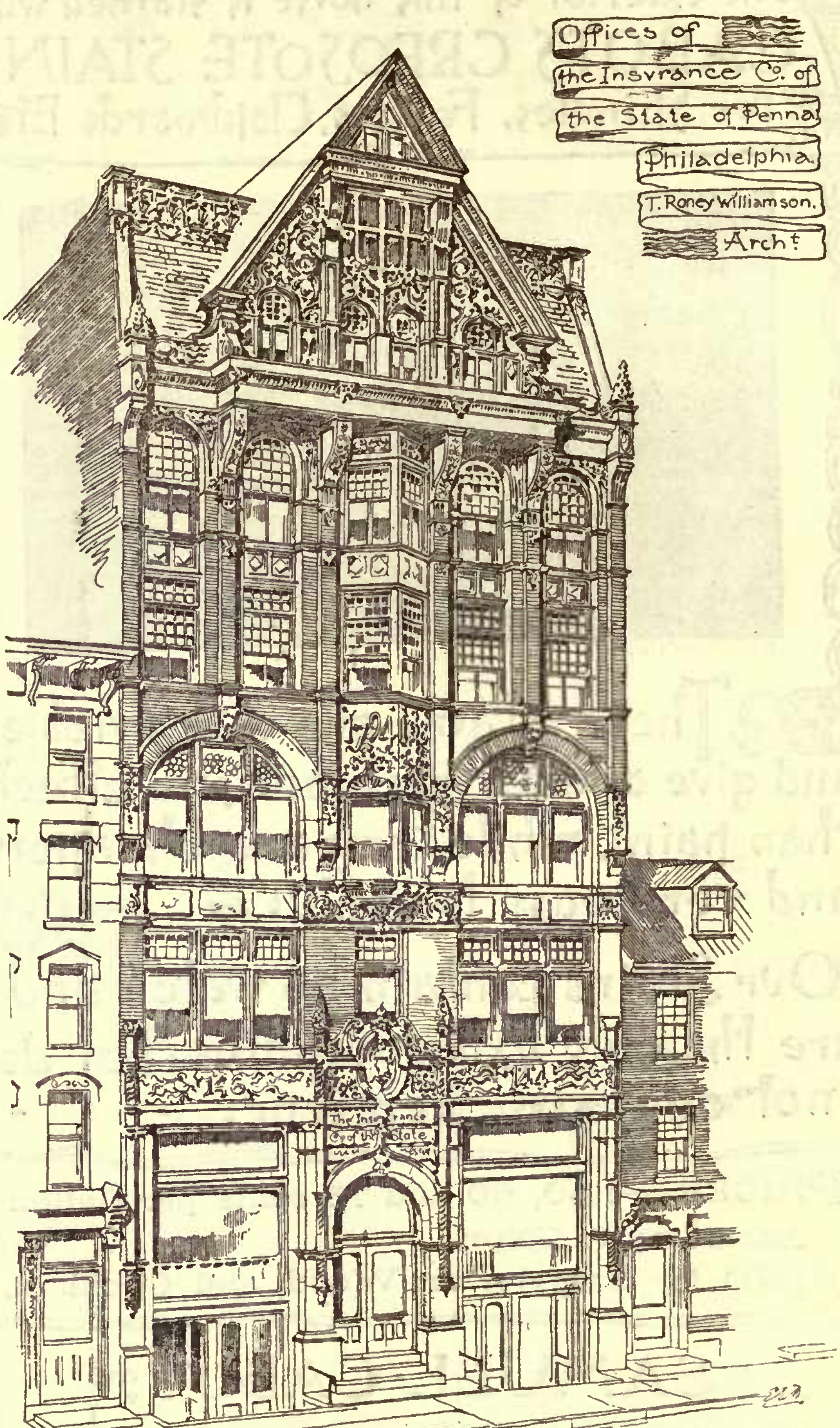
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NOVEMBER 16, 1889.

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IN connection with the description of the revived "Cohesive Construction," published in our last issue, a few comments might be made. There is no question that the use of our modern cements, which give us the power of binding fragmentary materials together by a matrix far stronger than any except the very hardest of the materials cemented, should long ago have led us to something beyond, or at least, different from the system of building vaults and domes exclusively with voussoirs, designed to maintain their equilibrium without the aid of cementing material, which we have inherited from the mediæval French and English architects, who were entirely ignorant of cements or hydraulic limes, and understood the preparation and treatment of ordinary lime so imperfectly that the mortar designedly counts for almost nothing in their constructions. It is a curious commentary upon the thoroughness with which the mediæval view of a vault, or arch-rib, has been, for the last nine hundred years, impressed upon the minds of students, that to this day there is not a single text-book on applied mechanics or building construction, so far as we know, in any language, which treats an arch as being anything else than a series of independent voussoirs, balanced in various ways, but free to slide upon each other; the effect of the mortar in keeping the voussoirs from sliding being completely ignored, as if it were too small to be considered. It is true that one sometimes comes across a corollary, to the effect that "the mortar in the joints will influence the result in an indeterminate degree," or that "the mortar in the joints may give to the arch, to a certain extent, the character of a coherent mass, so that the result of the calculation, by the system of independent voussoirs, may not precisely express the actual conditions, but the error, if any, will be on the safe side"; but no attempt, so far as we are aware, has ever been made to determine the exact amount of this "error" under given conditions, or, indeed, to investigate in any way the true play of forces in an arch with cemented joints, although in the great majority of arches, at least in this country and in England, the voussoirs are so far from being able to slide one upon another, after the theory of the books, that in many cases the voussoirs will break before they can either be separated at the joints, or made to slide upon each other.

TO regard an arch of this kind as being theoretically identical with an inverted chain is obviously absurd, yet all the mathematical conclusions in respect to arches and abutments which are to be found in the books are, without exception, deduced from this comparison, and the first step toward the formation of a theory applicable to modern arches and vaults has yet to be made. Our older readers have doubtless heard demonstrations that arches of a certain form, with abutments of a certain size, would infallibly fall, and have perhaps, by venturing to suggest that some of the Roman triumphal arches, which were of this form, had stood for two thousand years in defiance of their scientific duty, called down upon themselves the scorn of the lecturer, with the contemptuous explanation that the Romans employed a "concrete construction," which was not amenable to the laws of mathematics. Now, mathematics or no mathematics, we also use habitually a concrete construction, of the same type as that of the Romans, with the difference that ours is still more purely a concrete construction, since our cements are as much stronger and harder than theirs as theirs were than those of the mediævals, and we urgently need, what Señor Guastavino has begun to try to get for us, data and coëfficients in regard to our ordinary construction, with a reasonable theory for their use, which are not derived from the inverted catenary, or the sliding voussoir, but from the actual conditions which exist in brick arches put together with cement. For practical applications of the theory which is yet to be invented, Señor Guastavino appears to have had the sensible idea of going back to the works of the last people who built as we do, namely, the Romans. He found that they built vaults, as do their posterity to this day in Italy, with thin bricks, or tiles, laid flat, and therefore, for a given thickness of vaulting, exposing a far greater surface to the cohesive effect of the mortar. It is easily shown that an arch of a single four-inch ring of bricks of the ordinary size, six feet in span, has about fourteen hundred and forty square inches of joint surface for cementing the parts together; while an arch of the same span, width and thickness, composed of tiles, an inch thick, laid flat, with mortar spread over each ring of tiles before laying the next ring upon it, contains more than three thousand square inches of joint surface, and affords a correspondingly greater hold to the cement on which the strength of the construction depends. It is evident that this method of increasing the effect of the cement in such constructions must modify greatly the resistance to equal and unequal loading, the amount of thrust, and so on, and there is no more curious problem offered to the profession than that of determining the conditions which apply to such arches.

WE suppose that a good many of our readers were interested in the portion of the report of the Committee on Legal Decisions of the Western Association of Architects, which were published two weeks ago from the *Proceedings* of the last Convention of the Association, and a few remarks upon it may not be amiss. The first thing that strikes us is that, although the cases are undoubtedly correctly reported, and very judiciously commented upon, many architects would draw from the report an erroneous idea of the effect of an architect's certificate in general. In the first case, it is mentioned that "the contracts provided that the architect should be umpire, and payments were to be made on his certificate." Although the work was badly done, the architect gave his certificates, and the owner was compelled to pay, the court deciding that the owner, a widow, "was bound to pay the architect's certificate, just or unjust, and, if she had any case at all, she might bring suit against the architect," which she did, and recovered damages. In the second case, in which the contract was similar, we are told that the owner paid all the certificates, "as it would have been useless to contest the payment of any of them," but, on the conclusion of the work, she sued the architect to recover back a part of the money paid the contractor on his certificate, and won her suit.

THE impression which might be conveyed by these cases, that an architect's certificate is always final, and cannot be disputed, would be quite incorrect; and the kernel of the whole matter lies in the provision of the contract "that the architect should be umpire," by which we suppose is meant that the contract contained that foolish, useless and dangerous clause, which was once common in such documents, but is now nearly obsolete, that the decision of the architect should be final in all matters relating to the building. Without this clause, which no architect should allow to be inserted in any contract which concerns him, unless he enjoys learning law at his own expense, the architect's certificate is nothing more nor less than an expression of his opinion that the work has

been properly done up to a given point, and it is open to the owner to controvert this opinion, or to refuse to pay the amount certified to, or to demand deductions, or defend his interests in any way he thinks proper, if he has reason to think that the architect made a mistake in giving the certificate. Of course, the architect ought to be careful not to make mistakes, and as he is the best judge of what has been done, his certificate will have great weight as evidence, but it is not final, and does not bind the owner to pay for what he obviously has not got, unless the contract expressly makes it so. If it does make it so, as the decision quoted shows, the certificate cannot be questioned in court, and the owner has no alternative but to pay; but, if he is precluded from any appeal from the certificate, he has a remedy against the architect who gave it, if it is shown to be erroneous. There are several decisions which establish this point, all of them, as far as our references go, being in Illinois Courts.

IN the comments made by the Committee on the three cases, they say that "If the architect should not thus expressly declare himself to be sole arbiter, he would not be excused, but held under the rule of established custom." If this means that established custom regards the architect's certificate as infallible, and not open to question, it is fortunate for the profession that the custom prevails only over a very limited area. Architects have quite enough responsibility placed on their shoulders in seeing that the construction of our complicated modern buildings is correctly designed, and that the materials are judiciously chosen, without assuming to guarantee the perfect execution of work which they could not oversee in detail if they had the eyes of Argus, and devoted their whole time to inspection; and many of the best of them, in order that there may be no question as to the effect of their certificates, write them in the form that "in their opinion," or, "so far as they can judge," the work has been done to a certain point in accordance with the contract; while others, whose immense practice shows that their prudence and frankness does not frighten away clients, declare in print on their letter-heads that they "will assume no responsibility in regard to the execution of the work by contractors." The architects who guard their interest thus carefully are men who have money to lose, and who know by experience how great are the risks to which the members of our profession are exposed, and their example is well worthy of imitation by the younger architects, who will find that careful clients, with money to invest in important buildings, will choose an architect who knows how to manage his own affairs with prudence and discretion, in preference to one who recklessly assumes responsibilities through which he may be ruined in a day, without any fault of his own.

THE daily papers announce a great reduction in the price of aluminium, due to the improvement in the process of making it, and the result is likely to be a very great extension of its use. At present, the price, in lots of one thousand pounds or more, is two dollars a pound; for five hundred pounds the price is two dollars and a quarter a pound, and in smaller quantities the price per pound is somewhat increased. Practically, the price for all sorts of manufacturing purposes will be, for the present, two dollars a pound, as no manufacturer would buy a less quantity than half a ton. At this price it is for many purposes the cheapest material that can be used. The articles now made of German silver, and plated with silver or nickel, such as harness-mountings and many articles of builders' hardware, will be much cheaper, stronger and better of aluminium, which, at the new price, costs less than the German-silver base of the objects now sold. It must not be forgotten, in comparing aluminium with other metals, that it is only one-fourth as heavy as silver, and less than one-third as heavy as copper, the specific gravity being about the same as that of sulphur, so that if, for example, ten pounds of bronze metal, costing four dollars, will make ten pairs of door-knobs, at a cost, for material, of forty cents a pair, the same weight of aluminium, costing twenty dollars, will make thirty-three pairs of knobs, costing, for material, sixty cents a pair, but infinitely preferable to the bronze in nearly every respect. For plumbing fixtures, the solid aluminium would be about as cheap as the ordinary brass plated with nickel, and cheaper than brass plated with silver, but the aluminium has in this case the disadvantage of being acted upon by strong alkalies, so that washing-powders, or even the fancy toilet-soaps, some of which are strongly alkaline, might take off the polish from the faucets with which they came in contact. It would seem quite possible to remedy this defect in the pure metal by alloying it with a metal not attacked by alkalies, and, when this is done, a new and extensive field will be opened for its use.

THE last act in the great copper speculation of 1888 has just closed, with the decree of the court in the case of the directors of the banking-house of the Comptoir d'Escompte, which, it will be remembered, was ruined by its advances of money to carry out the unsuccessful attempt to "corner" the copper-supply of the world. The stockholders in French companies are very tenacious of their rights, and object to being betrayed by those in whom they place confidence, and, on the discovery of the bankruptcy of the company, they instituted proceedings, to see how far the directors could be held responsible for misconduct or neglect of their duties. The judgment in the matter of the Tribunal of Commerce has just been rendered. The manager of the company during the time of the copper speculation, M. Denfert-Rochereau, having committed suicide some months ago, was out of reach of the court, but his successor, M. Edward Hentsch, the President of the Council of Administration, together with four other members of the Council, who were found to have been, at the time of the transaction, either members of the Société des Métaux, or interested in some other way in the speculation, were condemned to pay two million, four hundred thousand dollars into the treasury of the reorganized company, in the usual French way, under which, if any one of the condemned has not the four hundred and eighty thousand dollars forming his portion, he must give up all he possesses, and his associates in the condemnation must make up the rest. Of the other directors, ten, who were not personally interested in the copper speculation, but who did not oppose, after they became aware of them, the operations begun without their knowledge by Denfert-Rochereau, are condemned to make up in the same way a contribution of twelve hundred thousand dollars to the treasury of the new company; and the "censeurs," or examiners, who ought to have seen that the stockholders' money was being improperly used, are required to pay two hundred thousand dollars.

THE Union Syndicale, or Master Builders' Association, of Brussels, advertises four competitions for the best devices for scaffolding of various sorts, eight prizes being offered. In Competition A, the first prize, of one hundred dollars, is to be given for the best scheme for a hanging stage, for the use of painters, and for washing down and pointing walls of masonry, to be shown by drawings, or a model, or both; and a second prize, of forty dollars, is to be given for the second-best plans for the same device. The subject of Competition B, is a staging standing on the ground, to be used for the same purposes as the hanging stage of the previous competition, and two prizes are offered, one of thirty dollars, and the other of ten dollars. The prizes in Competitions C and D are the same as in B. The subject of the first is a general scaffolding for the construction of city dwellings, where the weights to be supported on the staging are not very great; and that of the other is a system for protecting workmen on the roofs of buildings against accidents. Notice of intention to participate in the competitions must be sent to the Union Syndicale, Palais de la Bourse, Brussels, Belgium, before November 10, and further instructions can be obtained by writing to the same address. It is much to be hoped that the results of these competitions may be made public. We, in America, are rather behind the rest of the building world in the matter of scaffolding. Timber is cheap with us, and we think we can afford to nail joists and boards together and destroy them in taking them down, where an English or French builder is obliged to use poles, carefully tied together with chains and ropes, so as to get as much strength as possible, without injuring the materials for subsequent use elsewhere. Already, however, in New York, pole and rope stagings, like the foreign ones, are rapidly superseding those of joists and boards, and the more economical fashion is likely soon to become general. When that time arrives, there will be room for the display of a great deal of American ingenuity in the invention of new methods of tying and bracing, but it will do no harm to learn all we can about the best foreign methods as a preliminary, so that our progress may begin from as advanced a point as possible.

FILTRATION AT THE EXPERIMENTAL STATION IN LAWRENCE.[1]


Belfry at Runkel. From *Architektonische Rundschau.*

THE experiments upon filtration of water and sewage at the Lawrence experimental station have been continued by the Board throughout the year with very satisfactory results, giving additions to the knowledge of the world upon the subject of filtration, and showing, upon a scale large enough to approximate to the conditions of actual practice, the practicability or impracticability of methods heretofore deduced from laboratory experiments.

These results are elaborately presented and discussed in the Supplement by Mr. Mills, a member of the Board, who has had these experiments under his immediate charge.

Some of the general results only will be presented here.

Sewage can be much more efficiently filtered through open sand than through sand covered with soil. Very fine material, like dust, in the upper layers of a filter prevents free access of air, and, when wet, may exclude air so completely as to render purification impossible. With soil or sand containing dust at the surface, periods of intermission in the application of sewage may be made so long that the surface, becoming dry, may allow air to enter, and a high degree of purification may result; but the quantity of sewage that can thus be purified is very much less than when the upper layers of the filter are composed of open sand, through which the sewage will rapidly disappear, and will leave room for air to enter and come in contact with the thin laminæ of liquid covering the particles of sand.

The experiments of last winter show that intermittent filtration can be carried on upon a bed of coarse sand through the coldest weather when the beds are exposed to snow, but that the efficiency of the beds is much reduced by such exposure and the consequently low temperature of the sewage passing through the sand. By protecting the beds so that snow cannot fall upon them and reducing the temperature of the applied sewage to near the freezing point, the experience of the present winter, so far, indicates that very complete purification may be continued through very cold weather by applying the sewage intermittently at the temperature at which it ordinarily comes from the sewer. The experiments of last winter show that, when the beds are exposed to the snow, intermittent filtration may be carried on through the moderate weather of winter, alternated by continuous filtration during the colder period.

Filtering areas of sand covered with soil, or areas of very fine sand, may be much increased in efficiency in both summer and winter by digging trenches in the direction of a slight incline, about two feet deep and one foot wide and six feet apart, and filling them with coarse sand. The sewage should be applied to this coarse sand, and, once in a month or two, a half-inch in depth should be taken from its surface and replaced by clean sand. In winter the trenches should be covered with boards to keep out the snow.

The general results obtained at each of the filters will be briefly stated. To all of them, unless otherwise stated, sewage was applied intermittently at intervals of one or more days, and disappeared from the surface in a few minutes or in a few hours.

Four tanks, filled with clean, coarse mortar-sand from the same pit, were subjected to different conditions. One of these was exposed to the cold and snow, and, although it received sewage daily and removed about two-thirds of the impurities of the sewage during the very cold months of January, February and March, when filtering at the rate of 30,000 gallons per acre per day, it is evident from the results in the other three tanks, which were not exposed to frost, that the sewage entered and passed through but a fractional part of the area of this tank; and the result is as poor as if a much larger quantity had been applied to a like area not obstructed by frost.

The three other tanks were supplied with sewage at the rate, respectively, of 30,000, 60,000 and 120,000 gallons per acre per day; and, until nitrification commenced, in the latter part of March — periods of forty-one, thirty-one and twenty-seven days, respectively — the ammonias indicated that 97, 94 and 80 per cent of the impurities of the sewage were removed.

Nitrification began to increase in all of these tanks between March 26 and 30, when the temperature of the effluent was at 39° or 40°. In the course of three weeks the nitrates had increased from 0.025 parts in 100,000 to 0.250 parts, after which they increased much more rapidly, and nitrification was most complete from May 6 to 10, or six weeks after it began — the nitrates then amounting from 2.5 to 3.0 parts per 100,000.

During the increase in nitrification the ammonias also increased for a time, and became nearly one-third of those of the sewage; but, generally, before the nitrification reached its height, the ammonias decreased rapidly, until they became between one-half of 1 per cent and 1½ per cent of those of the sewage.

The rapidity of purification, as shown by the decrease in ammonias, was greatest in the tanks which had received the most sewage and had the greatest amount of nitrogenous matter stored in them, the effluent from the sand which had received the least sewage being more than a month later in reaching its condition of greatest purification.

The filter receiving sewage at the rate of 120,000 gallons per acre per day gave an effluent for three months after purification resulting from nitrification was established, in which the ammonias were less than 1½ per cent of those in the sewage. Upon increasing the amount filtered to 180,000 gallons per acre per day the ammonias increased, but for the next four months averaged less than 2 per cent of those of the sewage.

One of the filters, receiving sewage at the rate of 60,000 gallons per acre per day for seven months after purification was established, gave an effluent of nearly constant quality, having one-half of 1 per cent of the ammonias of the sewage, the free ammonia averaging 0.0012 parts and the albuminoid ammonia 0.0105 parts in 100,000 parts, showing less organic matter than many of the drinking-waters of the State.

The other filter of the same material, receiving 60,000 gallons of sewage per acre by day, gave an effluent for three months after purification was established, having between 1 and 2 per cent of the ammonias of the sewage, but in the next two months these increased to 6 and then to 10 per cent. This increase was due in part to the imperfect distribution of the sewage over the whole surface, which being corrected, the percentage of the ammonias decreased, and averaged for December 4½ per cent of those of the sewage.

The tank of this material, which has filtered at the rate of 30,000 gallons per acre per day, was, as stated, a month later than the others in reaching an established condition after nitrification became active. For the following six weeks the ammonias of the effluent were but 1 per cent of those of the sewage, and the nitrates were a little more than one part per 100,000.

At the end of this time the outlet was closed and the tank filled with sewage, and for the next four months the surface of the sand was kept covered with sewage, and the outlet was opened each day sufficiently to allow the regular quantity at the rate of 30,000 gallons per acre per day to flow out. The filter was thus changed from the condition of intermittent filtration to that of continuous filtration. During the first month the nitrates were reduced from one part per 100,000 to less than 0.01 part, at which they continued for the remaining three months. The ammonias rose in the first month from 1 per cent to 1½ per cent of those of the sewage. In the second month they become 31 per cent, and at the end of the fourth month were equal to those of the sewage.

This shows distinctly the radical difference in result between intermittent and continuous filtration. In intermittent filtration the nitrification was active, and, as shown by the ammonias, 99 per cent of the organic impurities were removed; while in continous filtration the nitrification ceased, and the same sand, filtering the same quantity of sewage, stored impurities for a time, but finally poured out an effluent quite as impure as the applied sewage.

From these open sands the number of bacteria in the effluent has, during the past six months, varied from 2 per cent to a very small fraction of 1 per cent of the number of bacteria in the sewage.

A filter of very fine sand, after filtering an amount equivalent to 8,600,000 gallons of sewage upon an acre, filtered at the rate of 12,000 gallons per acre per day, giving an effluent in which the organic matter, shown by the loss on ignition, was but 3 per cent of that of the sewage; and the nitrogenous matter, as shown by the ammonias, was but one-quarter of 1 per cent of that of the sewage.

The loss on ignition was	0.5000	parts in 100,000.
The free ammonia	0.0002	" "
The albuminoid ammonia	0.0062	" "
The nitrates	0.7000	" "

At the same time, the bacteria of the sewage amounted to 591,000 in a cubic millimetre, while those of the same quantity of effluent amounted to 2, and these may have come from the air while collecting the sample.

By both chemical and bacteriological analysis, this effluent from sewage has less organic impurity than the water of Lake Winnipiseogee, and contains but little more nitrogenous organic matter than city water filtered through the same material a year ago.

This sand stored much impurity in the winter. Nitrification began actively in June, and for three months appeared to be active in removing stored impurity, so that purification did not approach the completeness given above till September, since which time it has steadily grown more complete.

Another sand still finer than the last, having more than 10 per cent of very fine dust, and also containing nearly 2 per cent of organic matter (making up what is known as river-silt), gives its best results in December, after filtering in one year 45,000 gallons of sewage — the equivalent of 9,000,000 gallons on an acre — and while filtering at the rate of 12,000 gallons per acre per day. The organic matter of the effluent in the first half of December was reduced to one-quarter of what it was previously, and became but 4 per cent of that of the sewage; and the nitrogenous matter, as expressed by the ammonias, became 3½ per cent of that of the sewage.

[1] From the Twentieth Annual Report of the State Board of Health of Massachusetts.

charge—one who has come all the way from America to see our little port of Palos. *Bien, vaya con Dios, señor.* God be with you. You have a stick; give the *burro* the force of your arm!"

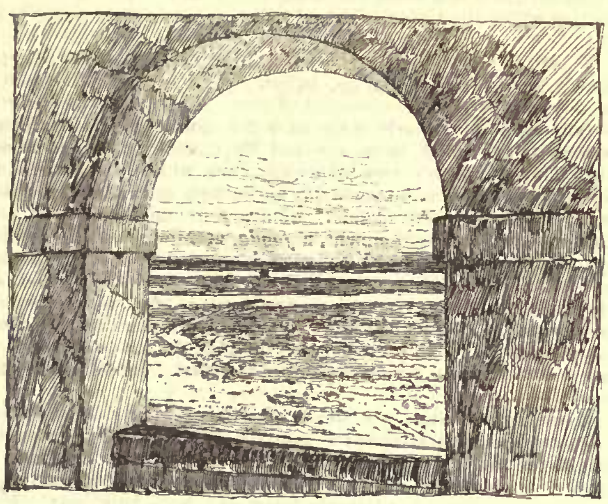
There was no saddle, and I sat astride an enormous pack of old bags, using my cudgel as a balancing-pole, though frequently bringing it down upon the donkey's drum-like paunch.

The Boy (with a big B) was abstracted, and the *burro* absorbed in meditation. Whenever I spoke to the Boy he turned upon me savagely, so I confined my attentions to the *burro*, tickling his ribs with my club, with occasional success in causing him to wag his ears and amble gently on.

The road is broad and smooth, but traversed by carts only in the vintage season, when the wines are carried to the port of Palos. Vineyards on either hand stretch away to low ranges of hills inland, and to the banks of the Rio Tinto. After an hour or so I sight the hamlet of Palos, a few mean houses scattered over a hillside and a long, straggling street. They are at least half a mile distant from the river, apparently, and it seems a misnomer to call this inland village a "port." But it was a port at the time of Columbus, and is so-called now. Its inhabitants are chiefly engaged in the vineyards of Moguer; some few go a-fishing. Four hundred, as a guess at the number of inhabitants, seems to me enough to include them all.

I drew up my donkey on the brow of the hill, and looked long at the white-walled Palos, so silent before me, so lifeless, so sad. I need not put on paper the thoughts that possessed me as I gazed, nor the pictures that arose before my mental vision; for I am an American, and have a share in that common heritage left us by Columbus.

Four hundred years only have passed since the great Genoese came here, to this very town of Palos, and sailed away, with its handful of sailor-citizens, to the discovery of a continent. And, though since then the cynosure of all eyes, little Palos has slumbered on, unmindful of its fame. One by one its prosperous men were



View from the Convent of La Rabida, Palos.

gathered out of sight; one by one its houses sunk to ruins; one by one its fleet depleted of its vessels, until, to-day, naught remains to Palos save the memory of its greatness. Its present inhabitants know nothing of its glorious past. Some of them had heard of Columbus; some remembered that it was said he sailed hence to America; but there was no memorial of him here, and I must see the *cura* to know more.

I waited an hour for the *cura*, the parish priest; but he was still less interested, and knew less of the subject I had at heart than the people. He was newly-arrived, busy with affairs of his parish, and I must excuse him; but he gave me permission to photograph the church and to ramble over the premises to my satisfaction. The sacristan, fortunately, was a gentleman and a schoolmaster, who knew something of history, and took a sympathetic interest in my mission. But he declared that there was no memorial of Columbus, and no manuscript, ancient or modern, in or about the church.

Now, this Church of San George is the veritable one in which Columbus read the commands of the King and Queen of Spain to the astonished people of Palos. Four hundred years have passed since then, but it stands to-day, doubtless, as it stood then, a simple church of stone guarding the entrance to the town.

I photographed its eastern façade and also its rear, where is a Moorish doorway draped in vines. As no services were going on, the great doors were thrown open, and I made some exposures of the interior. It is plain, severe, with few pictures, few images; but there is one thing here historic, and which may date from ante-Columbian days. This is a wooden image of St. George slaying the dragon. Sixty years ago, Irving saw this same saint, in the act of slaying this same dragon, and he particularly mentions that both had been recently repainted, and that the nose of the saint was rosy-hued as the sunset. It is, even now, as gorgeous as ever, and the nose almost bright enough to guide the dragon in striking at its tormentor in the dark.

As Saint George occupied a corner so dark that I could not obtain a photograph of his cheerful face, the sacristan and his little son obligingly trundled him out to a position near the doorway, and even offered to do the same by any of the images I might wish to secure pictures of. It was with reluctance that I left the church and turned my face towards Moguer, but the day was nearly ended, and the boy and the burro were impatient to be away.

Don Pedro, of the inn, received me with a good supper, with fruit of his garden and wine of his vineyard. It was quite dark, near nine o'clock in fact, when he invited me to go forth with him and see the town. His good *esposa*, the mother of his children, a jolly woman and comely, pounced upon us as we reached the *puerta*, and proceeded to give Don Pedro a rating. For, doubtless, she had seen the wink he had tipped me, and she knew of his wont in times past, "You are not to lead this señor *caballero* out of his way, remember; he does not want any *señorita* nor any *viuda* to cross his path, for he is too serious, and will make no foolishness." Don Pedro protested that he was only going to take me to the cathedral to see the paintings, and then to the convent chapel of the Puertocarreros. His wife eyed him sharply, but finally sent us away with a *vaya*, and a caution to me not to trust her husband too much, for his heart was greater than his discretion.

My guide was true to his promises, and led me only to places such as the tourist might like to view. In the cathedral, truth to tell, he did slip up behind a pillar and surreptitiously squeeze the hand of a kneeling damsel in black, whose mantilla-shaded face was like marble, and whose lips moved devoutly during it all.

"*Hombre!* what would you?" he demanded, in answer to my chiding, after the event. "Was she not there on purpose, and is she not the prettiest girl in Moguer? To neglect an opportunity like that would be to fly in the face of Providence, and I should hate myself forever after!"

"But what good, Don Pedro, to press the hand of a stranger whom you may never see again?"

"True, you may think so, but she liked it; and as to seeing her, that depends upon the answer she returns *to the note* I pressed into her palm! Ah, light of my soul, how can I wait till the morrow comes?

"But come, I see you take no interest in the daughters of Spain. True, indeed, they are small game, are women, to a man with a purpose. As I said before, Columbus was a great man, and a worthy, but he is dead and these fair children are alive! I like not dead things, let me live my day!"

He then conducted me to the house of the Pinzon family, still in possession of a descendant of the great Pinzon who sailed with Columbus.

Over the doorway their coat-of-arms, but no more, could I see, because the owner was absent. I understood my guide that the present owner held the place of admiral in the Spanish navy. It was not my good fortune to be entertained as Irving was, by a descendant of the Pinzones. I think I should have valued that honor more highly than any other in Spain, for it was to the two brothers, Pinzon, that Columbus was indebted for success. When he came here, penniless, without authority, they were prosperous citizens, men of influence over their neighbors, and we all know of the part they took in that eventful first voyage, furnishing money, men and vessels. Even the royal proclamation, when read in the Church of St. George, was of less avail than their brave example. Hardly treated, as they were, by Columbus and Ferdinand, yet posterity will not refuse them their meed of honor. The needy adventurer, who forgot their noble friendship after his success was won, has left no descendants direct, but the sturdy Pinzon stock still flourishes in its native soil.

Next we went to a convent church, Santa Clara, where Columbus and his sailors performed their vows after the return from the first voyage. You will recall, that they promised, if the Virgin would save them from the storm that threatened to destroy them, they would spend their first night ashore in prayer, in this very church of Santa Clara. Columbus, at least, fulfilled his vow, kneeling here all night before the altar. As the church was then it is now, with a magnificent *retablo*, fine statues and paintings It was erected by the Puertocarreros, whose tombs and whose marble effigies lie in niches on either side. They were a noble family. It was a Puertocarrero, you will remember, who was entrusted with the first vessel from Mexico, New Spain to Old Spain, 1519, bearing the rich treasure sent by Montezuma. It is my misfortune to have come here after one so talented as Irving, who has described this church, and the impression received from its gleaming marbles and the associations of history, in language I would gladly command were it possible.

I can only refer you to his pages, assuring you that his description is correct, and that the lapse of sixty years has made no change in Moguer, nor in the church where Columbus knelt in prayer an entire night on its cold marbles.

Frederick A. Ober.

Revising the New York Building Laws.—A Committee on the Revision of the Building Laws of New York City will hold meetings on each Monday, Wednesday and Friday, during November, in Room 701, Mutual Life Insurance Company Building, 32 Nassau Street, from 3 to 4 o'clock p. m., for the purpose of receiving suggestions from persons interested.

ARCHITECTURE FROM A FIREMAN'S POINT-OF-VIEW.



Belfry at Freiburg. From *Architektonische Rundschau.*

IT is universally acknowledged, theoretically at all events, that it is well for all of us on occasion to see ourselves as others see us; and on this principle it is not unreasonable to consider how buildings and building operations are regarded by those whose special business it is to provide for their protection from fire. The recent issue of new editions of two small works on this subject by the commanding officer of the London Fire Brigade,[1] offers a tolerably complete presentment of the fireman's view of building. It is a somewhat curious study for those accustomed to regard buildings in regard to architectural effect or to their provision for comfort as habitations, or their convenience for the carrying on of business, to go through a treatise in which buildings are regarded entirely in reference to their possible behavior if set on fire; and perhaps the architect, on his part, may find something to criticise in the recommendations of the fireman, over and above the general criticism that, after all, but a small proportion of buildings that are erected are actually burned, or even stand much chance of being burned (theatres excepted), and that, therefore, the provision against danger from fire cannot be allowed to override too much the immediate objects of architectural effect or practical convenience for working.

On the other hand, it must be admitted that the consideration of buildings wholly in regard to their probable behavior under fire leads the author of "*Fire Surveys*" to incidentally touch on some defects in structure which are equally defects apart from any contingency of conflagration, but the mischief of which is specially illustrated and emphasized under the action of fire. In respect to such points the Biblical phrase, that fire shall try every man's work, assumes a new significance. The importance of having a solid foundation and basing a wall properly upon it is certainly emphasized by the dictum of a writer of such long practical experience in the ways of buildings under fire, that the principal cause of walls "tumbling about" in a fire, thereby additionally endangering the lives of the firemen and adding to the difficulty of dealing with the fire, is in almost all cases traceable to the want of proper foundation. And in connection with this subject the author has some bitter remarks to make in regard to what he calls the "mysterious, unsatisfactory, and most expensive process known by the vague and unmeaning title 'underpining.'" The word, for that matter, seems to us to express its meaning well enough, nor is the process by any means necessarily either mysterious or unsatisfactory; but we have no doubt that there are not a few cases in which it is, in Captain Shaw's words, "nothing more or less than a trick or device to hide what is in every case at least a damage, and, as all firemen of experience have frequently and bitterly experienced, in many instances an imminent and serious danger." The ordinary builder and his foreman no doubt attach a kind of superstitious reverence to what they call "underpinning," which with them often amounts to no more than curing a bad foundation by carrying a wall farther down into one which is no better. It is like the elephant of Hindu mythology which stands on the tortoise, while there still remains the question, What does the tortoise stand on? Captain Shaw's fling at "this process, or trick, or device" will do good if it leads any building owners (or builders) to consider the matter a little more philosophically, and to reflect that the supporting wall introduced below is not necessarily any firmer basis unless it plants its foot in turn on a firm foundation. But if that firm foundation be secured either by coming down to rock or other firm natural bed, or by adequately-executed concreting, there is no reason why underpinning should be a delusion. We quite agree, however, that to underpin a single building of a row or block while the rest "is allowed to go on in its natural process of sinking," is only likely to result in unequal settlement of the walls and consequent cracks and further weakening. In such cases, where there is a division of immediate ownership, safety can only be attained by the intervention of public authority; and when our building legislation next comes to be revised, it may be desirable to consider whether any future form of Building Act should not regulate the conditions of underpinning somewhat more in detail, instead of merely requiring a general notice to the District Surveyor or other analogous official. If Captain Shaw's representations bring about more careful attention to this matter of underpinning and its effects on structural stability he will have done good, though it by no means follows that all underpinning is as useless or dangerous as firemen appear to suppose.

We referred the other day to the difficulties experienced at a fire in Melbourne in dealing with very lofty buildings, and Captain Shaw urges the same consideration. The risk of a building is said to be, in general terms, in direct ratio to its cubical capacity: so much more space, so much more chance of something getting on fire, so much more space for fire to develop, and, in general, so much more bulk of material for it to feed on. But beyond a certain height the fire-risk increases also with the height, as the fire-extinguishing and life-saving appliances now available are inefficient or useless above a certain height. This may be added to the reasons already adduced of late for taking some steps to limit the alarming tendency of town buildings to climb higher and higher. At all events, we are told, "persons who erect high buildings should invariably make their own arrangements for getting down externally to spots within reach of the ladders or other means of escape available from outside," and this means to a height of about forty feet from the ground, beyond which height life-saving appliances cannot be counted on at present.

In regard to walls, the fireman will be found to be dead against stone, as the very worst material that can be used in building. As far as the use of stone for so-called fireproof staircases is concerned, this is now matter of common knowledge, and it is in great measure owing to Captain Shaw's representations that this has been brought about; but he comments on the fact that the law still recognizes stone as fulfilling the requirements of a fireproof material for lobbies, stairs, etc., and that incalculable injury has been done by this piece of legislation, which ought to be reformed without delay; for though every competent architect and surveyor knows better now, the fact remains that in London a stone staircase complies with legal obligations, and the surveyor has no power to disallow it; and though every one knows now (thanks, again, mainly to Captain Shaw's former publication of his experiences) that an oak staircase would resist fire far better than a stone one, and remain longer in a safe condition for use in a fire, yet in any public building in progress we are still liable to see the spectacle of the district surveyor solemnly condemning and ordering out a wooden staircase, and demanding the substitution of a stone one, according to law. This is one of the matters which the County Council will be expected to look to before long.

It can hardly be expected that architects will accept Captain Shaw's dictum that "copings, balconies, cornices or other projections should never be constructed of stone, as this material is certain to fall down at an early stage of a fire, and is likely to kill both persons endeavoring to escape and those coming to render aid." This is the fireman's view of architecture with a vengeance: that because a building might some day be burned, and in that case stone cornice-blocks or corbels would fall, therefore all buildings are to be shorn of whatever architectural enrichment and effect is to be gained by oversailing stonework. That is an example of the unreasonableness of specialists, who can see things from no point-of-view but their own. The caution that walls constructed of stone alone are often found to stand better than those of stone with brick backing is more to the point; the different behavior of the two materials under fire may have an even worse disintegrating and twisting effect than results in a wall entirely of stone. Captain Shaw's opinions about the bonding of walls are much open to question. In "*Fires in Theatres*," he remarks (page 6) that "it is a great mistake to have a number of internal walls merely touching the external ones, and not bonded into them or in any way contributing to the support of the structure." Where has Captain Shaw seen walls built thus? From another passage, however, in "*Fire Surveys*," we gather that the fireman's notion of bonding one wall into another is that "an external wall should be firmly tied to party and return walls by strong wrought-iron anchors, of sufficient strength and number to keep the whole of the building firmly fixed without the assistance of floors, roofs or internal ties of any kind." The fireman's great desire is that the walls should be independent of floors, so as not to collapse when floors fall in, and he wants to be sure that the front wall will not part from the cross-walls during fire. Now, if we were providing for a building which was probably to be burned in a year or two, Captain Shaw's "anchors" might be accepted as an additional security against the parting of the walls; but as, after all, we construct buildings with the intention that they shall last many years and *not* be burned, we should object to the "anchors" as introducing an element of decay into a structure otherwise of permanent materials. Captain Shaw is alive to the danger of wood bond, but sees none in hoop-iron bond or in his proposed "anchors"; but iron is always an element of decay in a wall, and, besides, if the wall gets greatly heated in the fire, the iron within may itself get heated sufficiently to act as a destructive agent in cracking and twisting the wall. Ordinary brick bond may, no doubt, be insufficient, from the fireman's point-of-view, between walls meeting at right angles; but a stronger bond than the iron anchors, and one not liable to be affected by fire, might be formed by employing long tailing-pieces of concrete every few courses, built in cement into the cross-wall, and with a short cross-head, formed in the same piece of concrete, bedding on the front wall, and even (for greater security) with square joggles formed on the under side to tooth with the courses of bricks. The tensile strength of the concrete blocks would not support the weight of the outer wall if applied vertically, of course, but it would be ample to prevent the wall settling out of the perpendicular and away from the cross-walls in the first instance, and it would form a permanent element of strength in the wall. That is how we should provide against the fireman's dread of the walls parting, and he might go safely on brick walls thus bonded. But metallic bond is

[1] "*Fire Surveys, or a Summary of the Principles to be Observed in Estimating the Risk of Buildings.*" By Captain Eyre M. Shaw, C. B., London Fire Brigade. Third Edition. London: Effingham Wilson & Co., 1889.
"*Fires in Theatres.*" By Eyre M. Shaw, London Fire Brigade. Second Edition. London: E. & F. N. Spon, 1889.

etc., and dyed with chromate of yellow. Many sulphur mines have been worked in Sicily by foreigners, but very few of these have succeeded in getting any profit.

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and a tequate descriptions of the buildings, including a statement of cost.*]

THE UNION THEOLOGICAL SEMINARY, PARK AVE., 69th AND 70th STREETS, NEW YORK, N. Y. MESSRS. LORD & POTTER, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print, issued only with the Imperial Edition.]

HOUSE OF WM. HAMLIN, ESQ., BUFFALO, N. Y. MESSRS. MARLING & BURDETT, ARCHITECTS, BUFFALO, N. Y.

THE house is built of Kibbe sandstone up to the first-story window-sills, the walls above being of mottled Pompeian brick, specially made for this work at Perth Amboy, N. J. The window jambs, arches and cornices are of moulded brick of special design. The roof is covered with red Spanish tile laid in cement, with copper flashings. With the exception of the roof, the house is of fireproof construction throughout, all interior walls, partitions and furrings, without exception, being of hollow-brick or terra-cotta. The house is heated throughout by indirect hot-water radiation, the temperature of the various rooms being regulated by the "Johnson Heat Regulator." The plumbing work is of the most elaborate description, the bath-rooms, lavatories, etc., being tiled, with all piping exposed and nickel-plated throughout. Special ventilation is secured by a large vent-shaft, heated by the furnace smoke-pipe, with ventilating-ducts connecting with the various rooms and closets. The plans show the arrangement of the first and second floors. The basement contains the laundry, preservatory, furnace and coal rooms, and store-rooms. The third story contains two guest-rooms, five servants'-rooms, two dressing-rooms, two bath-rooms, play-room, 19′ x 28′, linen and trunk rooms. The house is handsomely finished throughout in hard woods, the main hall being in prima vera, a special feature being an arcade between the hall and library of rose Aurora marble and onyx. The principal rooms have hard-wood floors with inlaid borders, the vestibule floor being of marble mosaic. There are seventeen fireplaces in the house, many of them having facings and hearth of rich African marbles or marble mosaics. The kitchen has the walls built of English glazed brick. The house is arranged to be lighted throughout by electricity, but is also piped for gas, with electric gas-lighting. In fact, no pains have been spared to make the house complete in every respect.

HOUSE AND LAUNDRY FOR FRANCIS W. KENNEDY, ESQ., BRADFORD HILLS, CHESTER CO., PA. MR. FRANK MILES DAY, ARCHITECT, PHILADELPHIA, PA.

THE house is situated near the main line of the Pennsylvania Railroad, twenty-nine miles from Philadelphia, on a hill commanding extensive views of both the Chester and Brandywine Valleys. The cedar shingle roofs remain unpainted.

A METHOD OF EMPLOYING HOLLOW BLOCKS IN BUILDING. MR. W. REDMORE RAY, ARCHITECT, LOS ANGELES, CAL.

LOS ANGELES, CAL., September 26, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— Among the drawings I have forwarded for reproduction, if you please, is one I trust you will not consider merely an advertising scheme on my part, but that the idea contained therein is of sufficient interest to the architectural profession to warrant its appearance, though it is due to you to state "Letters patent" were granted me for the same, the 12th of March, the current year.

As will be seen, the method consists in constructing walls of hollow blocks or frames of any convenient size or shape (not necessarily rectangular) each block having a groove around its outer periphery — the nature and purpose of the groove, when the blocks are placed in position, is to receive liquid cement or molten lead, forming when hardened a continuous dovetail, key or dowel throughout, binding the blocks as one. The slabs or plates forming the inner and outer wall-surfaces are then fitted: they conform in outline to the blocks, have rebated edges and a surrounding groove. Cement and strap-iron at intervals give the required adhesiveness to the blocks. The continuous cross-joints of this method admit of its easy combination with steel in the construction of walls for many storied structures, as even for floors and roofs. Walls so constructed of suitable materials would be light and durable, fire, vermin and weather proof; greater ease, accuracy and expedition in use, no waste of material; lathing and plastering entirely dispensed with and an opportunity for new improved wall-surfaces, having advantages over those in present use, in regard to durability, impermeability and artistic treatment in form and color.

Whatever may be thought of this as a means, it appears to me the method aims at an architectural "consummation devoutly to be wished," *viz.:* permanent wall-decoration and one, judging from editorials that have appeared in your journal from time to time, notably that of June 9, 1888, you are entirely in accord with and interested in bringing about.

The other drawing shows a further application of this method. The blocks in this instance are twelve inches square by six inches wide: for circular portion of walling no change in form or size of block is necessary, the V-shaped spaces between them being filled with cement and the sweep formed on the slab or plate. As indicated, the roof is constructed of similar blocks and slabs of slightly different form and dimensions to provide a horizontal bed and lap-joints to the slab. The wall-surfaces being impermeable are easily cleansed, contributing to the comfort of the household. The building being hermetically closed, for ventilation a system of fresh-air and exhaust ducts ensures a continuous current of warmed or cooled air as occasion requires throughout the various apartments. The slabs or plates forming the external and internal wall-surfaces are supposed to be of faience or similar ware, but those for the outer walls to be of opaline glass and for purposes of vision omitting a sufficient number of blocks where clear glass is inserted, the entire external wall would be luminous and unbroken, a departure from the monotonous division of solid and void enforced by utilitarian considerations, this division of windows and tiers rendering those thoroughfares other than first-class ones meagre in the extreme. Should we not thus again see the power and grandeur of effect in masses of unpierced walling as in old feudal buildings but far excelling them in interest?

COLUMBUS:

A PILGRIMAGE TO PALOS.



TWELVE years ago, sailing between Dominica and Martinique, the verdure-clad islands midway the Caribbee chain, I first saw land discovered by Columbus. I was strangely thrilled; nor shall any scoffer put me down as a sentimental voyager because I attached an importance to those islands not set down in the admiralty charts.

A year later, and I had added, of the isles the great navigator first described, Guadaloupe, and sister islands, and that fair domain of the Caribs lying not far from the mouth of the Orinoco, Trinidad —*La Trinidad*, the Trinity, so-named by Columbus from its triple-peaked mountain, as he first looked upon it from the deck of his storm-tossed *caravel*, in 1496.

In 1880, during a second visit to the West Indies, I visited all the islands from Porto Rico to Trinidad: the Virgins, by Columbus so-called in honor of the hapless Saint Ursula and her immortal ten thousand; St. Christopher, whose volcano presented the shape of the good giant who bore on his shoulders the infant Jesus, and a score of others of lesser note.

In 1881, on the coast of Yucatan, I was minded of the last voyage of Columbus, in 1502, when he found here that great *canoa* laden with chocolate beans, copper utensils and cottons, and guided by mariners of greater intelligence than any other of these new peoples he had seen.

Seven years later, in 1887, I had the Bahamas to explore, and then first saw that island on which Columbus first landed, San Salvador, rising ghost-like from the sea. Beyond, the cloud-like expanse of Watling's Island, the first land-fall of that eventful voyage of 1492. The south coast of Cuba gave me *Las Jardines de la Reina* those emerald "Gardens of the Queen," and *Cienfuegos*, the "Bay of the Hundred Fires."

Wherever I had voyaged, I had met with reminders of Columbus. And, having viewed with so keen an interest these fruits of his garnering, was it strange that Spain, the mother-country, should have held for me no more precious relics than those of Columbus?

Throughout Spain, to-day, are scattered these memorials of Colon. In Madrid, the Royal Armory contains his armor, the naval museum one of his charts. At Valladolid he expired, in 1506, and the house is still pointed out in which he drew his last breath. It is now put to ignoble uses, and a sign upon it proclaims it the depository of cows' and asses' milk: "*leche de vacas y de burras, se sirve á domicilio.* The convent, also, is there, in which his remains were first interred.

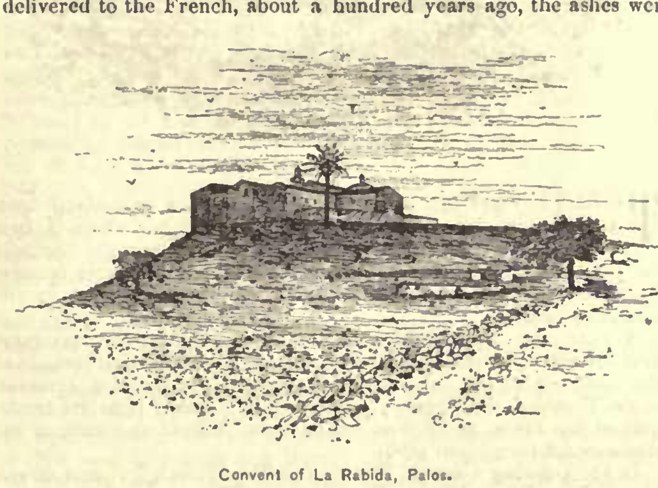
The student may trace the wanderings of Columbus through all Spain, but it is in the South, in Andalusia, *la Tierra de Maria Santissima*, that most of his memorials are found. Notably is Seville, queen city of the Guadalquivir, rich in *Colombiana*, chiefly found in the Columbian Library, containing the 20,000 volumes given to the cathedral by Fernando Columbus. There, in charge of jealous guardians, are many valuable books, and (if one may believe what we may scarcely doubt) the very journal of Columbus, a volume with marginal notes by his own hand, and one of his charts. Those very islands of the Bahamas, which I myself have seen, dim and shadowy, and shining in the sun, are here outlined by the great discoverer himself, upon paper discolored and stained by sea-salt, as though it had accompanied him on all his voyages.

But, the greatest wealth of Columbian and post-Columbian material for history is buried in the archives of the Lonja, that magnificent building erected by Charles III, about a hundred years ago. Here, carefully bundled, and secured in mahogany cases, are the famous archives of Seville from the first period of American history — *Los archivos de las Indias.* Access to their vast wealth the early historiographers of Spain often had, but it has not been half exploited. Hither, also, came Washington Irving, sixty years ago; but I doubt if he quarried much.

Framed separately and hung against the wall, are the signatures of the most famous of those *conquistadores* who made Spain's power so great: such as Balboa, Cortez, Vespucci, De Soto, Velasquez, and the sign-mark of Francisco Pizarro. Every one is well-nigh priceless, every one that of a man more famous than whoever may read these lines; yet, we may not linger to examine them now.

That which oftenest drew me, and longest held me, was the marble slab in the pavement of the great cathedral that formerly covered the remains of Columbus, and now marks the last resting-place of his son, Don Fernando. All the world has heard of this marble, let into the pavement of the cathedral, at the west end of the central aisle, with its oft-quoted inscription: "*A' Castilla y Leon, Mundo Nuevo dió Colon.*"

The inscription is in quaint old Castilian, in a circle, with a finely-carved *galera* — such as Columbus sailed in — on either side. In the centre is a globe in outline, with arms and banners around it. But the remains of Columbus do not rest here, though brought to Seville from Valladolid: they were taken hence to San Domingo, in the early part of the sixteenth century; when that island was delivered to the French, about a hundred years ago, the ashes were



Convent of La Rabida, Palos.

taken to Havana, where a tablet in the cathedral there indicates the supposed last resting-place of Colon. It is denied by the Dominicans that it was the remains of Columbus that were taken, but some other, perhaps his brother Bartholemew. Let them decide between themselves; it matters little, for not much remains to quarrel over, after the lapse of nigh four hundred years.

The greater, the more glorious, remains of Columbus, are to be seen in Spain, and mainly in Seville. At Seville, I dwelt in a priest's house, and my friend gave me a letter of introduction to the *cura* of Moguer, the town nearest Palos. In the morning (28th April, 1888) I left the house at six, accompanied by the faithful servant, Manuel, who carried my little luggage. At the station, the guard would only let him through by the payment of a *real*, and this he paid, for the privilege of seeing me aboard the cars. A *copeta* of *aguardiente* soothed his feelings a little, but I allowed him to vigorously express his opinion of the railway officials before remonstrating. Soon after pulling out of the station, the train crosses the Guadalquivir and flanks the hills, passing through fields of grain and olive orchards. Seville is truly queenly, sitting on the plain, her towering Giralda rising above the outline of distant hills. Two-thirds the distance is through a fertile and highly-cultivated plain, but after that the plains are barren, though now covered with flowers, purple, in many places, with sheets and beds of bloom. We pass the ruined walls of what appears to have been a Roman fortification of ancient times, and then cross a river flowing over ferruginous rocks, most curiously worn. The character of the soil is shown in the color of the water, which is yellow and deep red. It is not till I cross the river a second time, in the *diligencia*, that I remember this must be the historic river, well and truly termed the Rio Tinto!

Just sixty years ago, the gentle Irving crossed these plains, on horseback, and his story beguiles the hours of travel on the train.

I leave the railway at the station of San Juan del Puerto, on the flat lands of the river, and take an old carriage for Moguer, a league



Entrance to Convent of La Rabida, Palos.

distant, on a hill. It was a disagreeable ride, crowded in with men and women, most of them asleep. My companions, such as were awake, were incessantly smoking, and three of them, a man and two women, frequently drinking *aguardiente* from a curious horn with a mouth-piece in its convex side. Contrary to my expectations, I find a good house of entertainment, a *fonda*, at Moguer, with clean beds and an excellent table. Very soon I am served with *almuerzo*, or breakfast, with delicious wine from surrounding vineyards. This wine is of a golden color, with fine bouquet, and is celebrated at Seville as "*el vino de Palos.*" This rich, ochreous earth seems to have bestowed its fatness upon the wine-vat; not the plains of Xeres, produce wine of so rare a flavor as this made on the banks of the Rio Tinto.

Mine host, though a man of intelligence and inquisitive, was lamentably ignorant regarding things Columbian. He excused himself, saying he was from another province, and not posted on the affairs of Palos. "This man, Columbus, when did he sail, and is *el señor* sure that he sailed from Palos? No ship of any size has left Palos these many years; the village, even, is half a mile from the river." But he had lived long enough here to know where the prettiest girls were domiciled, and he insisted on taking me around to look at the house of a vivacious *viuda*, a widow, of whom he was enamored.

We did not see the fair widow herself. "But no matter, *señor estrangero*, you have seen the casket that contains the priceless pearl of Moguer. Ah! had I not a wife and children, my hand, as well as my heart, should be quickly offered her."

"What say you, *amigo mio?* Let me present you to my *querida.* She hath a vineyard, the like of which is not this side the Guadalquivir; and as to herself, you have my word for it, she is a pearl of price. I think she would take to thee kindly; it is the way of women to look with favor upon a stranger, providing he be not ill-conditioned."

I thanked my friend, but insisted that my heart was given over to Columbus — that he had, at least, the prior claim.

"Very well, *amigo*, but you may regret it. Colon must be a dry subject — *muy seco;* but the *viuda* — *ojos brillantes como las estrellas* — eyes bright as stars! My heart, but what a stick is this American! *Vaya!* I'll find thee a boy to act as a guide to Palos; also a *burro.* It makes me impatient to have such a man about me."

Palos and Moguer are a strong league apart, and I must either walk or hire a donkey, no horse being available, and only an occasional *carro* or clumsy cart. The boy my host secured was the surliest specimen in Spain; but this may have been owing to the fact that he had lost one arm early in life, and probably was put to great shifts to get a living. He led up a *burro*, hooked my valise onto his arm-stump, seized the rope attached to the donkey's nose, and then strode ahead without a backward glance. A well-directed oath from Don Pedro took him between the shoulders, as it were, and halted him long enough to allow me to scramble upon the donkey's back; then ahead he went again, pursued by the maledictions of my friend.

"What a devil of a boy, to be sure! And to think that I should have been the means of putting a distinguished traveller n his

charge — one who has come all the way from America to see our little port of Palos. *Bien, vaya con Dios, señor.* God be with you. You have a stick; give the *burro* the force of your arm!"

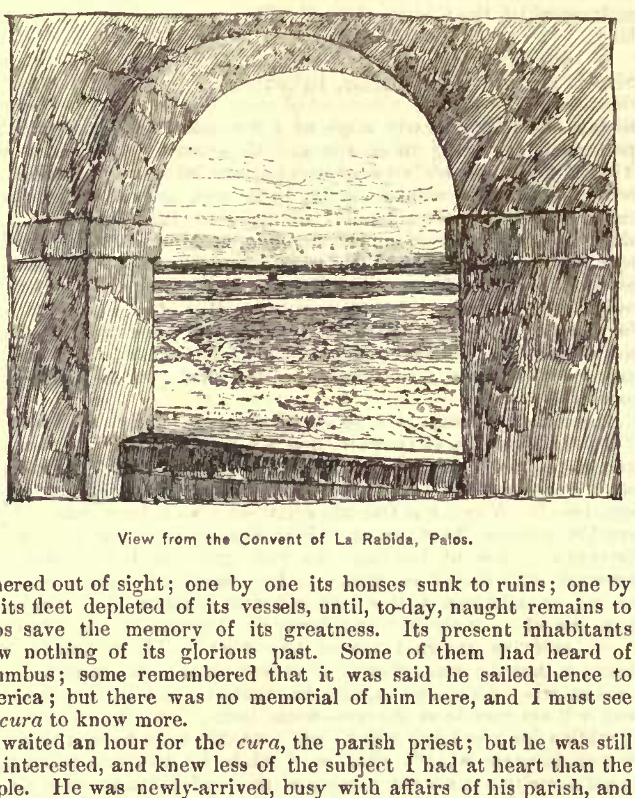
There was no saddle, and I sat astride an enormous pack of old bags, using my cudgel as a balancing-pole, though frequently bringing it down upon the donkey's drum-like paunch.

The Boy (with a big B) was abstracted, and the *burro* absorbed in meditation. Whenever I spoke to the Boy he turned upon me savagely, so I confined my attentions to the *burro*, tickling his ribs with my club, with occasional success in causing him to wag his ears and amble gently on.

The road is broad and smooth, but traversed by carts only in the vintage season, when the wines are carried to the port of Palos. Vineyards on either hand stretch away to low ranges of hills inland, and to the banks of the Rio Tinto. After an hour or so I sight the hamlet of Palos, a few mean houses scattered over a hillside and a long, straggling street. They are at least half a mile distant from the river, apparently, and it seems a misnomer to call this inland village a "port." But it was a port at the time of Columbus, and is so-called now. Its inhabitants are chiefly engaged in the vineyards of Moguer; some few go a-fishing. Four hundred, as a guess at the number of inhabitants, seems to me enough to include them all.

I drew up my donkey on the brow of the hill, and looked long at the white-walled Palos, so silent before me, so lifeless, so sad. I need not put on paper the thoughts that possessed me as I gazed, nor the pictures that arose before my mental vision; for I am an American, and have a share in that common heritage left us by Columbus.

Four hundred years only have passed since the great Genoese came here, to this very town of Palos, and sailed away, with its handful of sailor-citizens, to the discovery of a continent. And, though since then the cynosure of all eyes, little Palos has slumbered on, unmindful of its fame. One by one its prosperous men were



View from the Convent of La Rabida, Palos.

gathered out of sight; one by one its houses sunk to ruins; one by one its fleet depleted of its vessels, until, to-day, naught remains to Palos save the memory of its greatness. Its present inhabitants know nothing of its glorious past. Some of them had heard of Columbus; some remembered that it was said he sailed hence to America; but there was no memorial of him here, and I must see the *cura* to know more.

I waited an hour for the *cura*, the parish priest; but he was still less interested, and knew less of the subject I had at heart than the people. He was newly-arrived, busy with affairs of his parish, and I must excuse him; but he gave me permission to photograph the church and to ramble over the premises to my satisfaction. The sacristan, fortunately, was a gentleman and a schoolmaster, who knew something of history, and took a sympathetic interest in my mission. But he declared that there was no memorial of Columbus, and no manuscript, ancient or modern, in or about the church.

Now, this Church of San George is the veritable one in which Columbus read the commands of the King and Queen of Spain to the astonished people of Palos. Four hundred years have passed since then, but it stands to-day, doubtless, as it stood then, a simple church of stone guarding the entrance to the town.

I photographed its eastern façade and also its rear, where is a Moorish doorway draped in vines. As no services were going on, the great doors were thrown open, and I made some exposures of the interior. It is plain, severe, with few pictures, few images; but there is one thing here historic, and which may date from ante-Columbian days. This is a wooden image of St. George slaying the dragon. Sixty years ago, Irving saw this same saint, in the act of slaying this same dragon, and he particularly mentions that both had been recently repainted, and that the nose of the saint was rosy-hued as the sunset. It is, even now, as gorgeous as ever, and the nose almost bright enough to guide the dragon in striking at its tormentor in the dark.

As Saint George occupied a corner so dark that I could not obtain a photograph of his cheerful face, the sacristan and his little son obligingly trundled him out to a position near the doorway, and even offered to do the same by any of the images I might wish to secure pictures of. It was with reluctance that I left the church and turned my face towards Moguer, but the day was nearly ended, and the boy and the burro were impatient to be away.

Don Pedro, of the inn, received me with a good supper, with fruit of his garden and wine of his vineyard. It was quite dark, near nine o'clock in fact, when he invited me to go forth with him and see the town. His good *esposa*, the mother of his children, a jolly woman and comely, pounced upon us as we reached the *puerta*, and proceeded to give Don Pedro a rating. For, doubtless, she had seen the wink he had tipped me, and she knew of his wont in times past, "You are not to lead this señor *caballero* out of his way, remember; he does not want any *señorita* nor any *viuda* to cross his path, for he is too serious, and will make no foolishness." Don Pedro protested that he was only going to take me to the cathedral to see the paintings, and then to the convent chapel of the Puertocarreros. His wife eyed him sharply, but finally sent us away with a *vaya*, and a caution to me not to trust her husband too much, for his heart was greater than his discretion.

My guide was true to his promises, and led me only to places such as the tourist might like to view. In the cathedral, truth to tell, he did slip up behind a pillar and surreptitiously squeeze the hand of a kneeling damsel in black, whose mantilla-shaded face was like marble, and whose lips moved devoutly during it all.

"*Hombre!* what would you?" he demanded, in answer to my chiding, after the event. "Was she not there on purpose, and is she not the prettiest girl in Moguer? To neglect an opportunity like that would be to fly in the face of Providence, and I should hate myself forever after!"

"But what good, Don Pedro, to press the hand of a stranger whom you may never see again?"

"True, you may think so, but she liked it; and as to seeing her, that depends upon the answer she returns *to the note* I pressed into her palm! Ah, light of my soul, how can I wait till the morrow comes?

"But come, I see you take no interest in the daughters of Spain. True, indeed, they are small game, are women, to a man with a purpose. As I said before, Columbus was a great man, and a worthy, but he is dead and these fair children are alive! I like not dead things, let me live my day!"

He then conducted me to the house of the Pinzon family, still in possession of a descendant of the great Pinzon who sailed with Columbus.

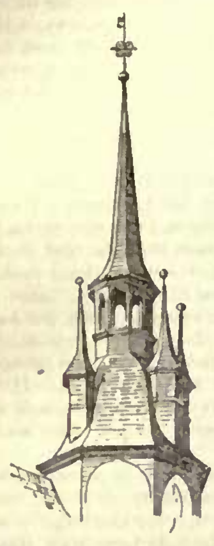
Over the doorway their coat-of-arms, but no more, could I see, because the owner was absent. I understood my guide that the present owner held the place of admiral in the Spanish navy. It was not my good fortune to be entertained as Irving was, by a descendant of the Pinzones. I think I should have valued that honor more highly than any other in Spain, for it was to the two brothers, Pinzon, that Columbus was indebted for success. When he came here, penniless, without authority, they were prosperous citizens, men of influence over their neighbors, and we all know of the part they took in that eventful first voyage, furnishing money, men and vessels. Even the royal proclamation, when read in the Church of St. George, was of less avail than their brave example. Hardly treated, as they were, by Columbus and Ferdinand, yet posterity will not refuse them their meed of honor. The needy adventurer, who forgot their noble friendship after his success was won, has left no descendants direct, but the sturdy Pinzon stock still flourishes in its native soil.

Next we went to a convent church, Santa Clara, where Columbus and his sailors performed their vows after the return from the first voyage. You will recall, that they promised, if the Virgin would save them from the storm that threatened to destroy them, they would spend their first night ashore in prayer, in this very church of Santa Clara. Columbus, at least, fulfilled his vow, kneeling here all night before the altar. As the church was then it is now, with a magnificent *retablo*, fine statues and paintings It was erected by the Puertocarreros, whose tombs and whose marble effigies lie in niches on either side. They were a noble family. It was a Puertocarrero, you will remember, who was entrusted with the first vessel from Mexico, New Spain to Old Spain, 1519, bearing the rich treasure sent by Montezuma. It is my misfortune to have come here after one so talented as Irving, who has described this church, and the impression received from its gleaming marbles and the associations of history, in language I would gladly command were it possible.

I can only refer you to his pages, assuring you that his description is correct, and that the lapse of sixty years has made no change in Moguer, nor in the church where Columbus knelt in prayer an entire night on its cold marbles. Frederick A. Ober.

Revising the New York Building Laws. — A Committee on the Revision of the Building Laws of New York City will hold meetings on each Monday, Wednesday and Friday, during November, in Room 701, Mutual Life Insurance Company Building, 32 Nassau Street, from 3 to 4 o'clock p. m., for the purpose of receiving suggestions from persons interested.

ARCHITECTURE FROM A FIREMAN'S POINT-OF-VIEW.



Belfry at Freiburg. From *Architektonische Rundschau.*

IT is universally acknowledged, theoretically at all events, that it is well for all of us on occasion to see ourselves as others see us; and on this principle it is not unreasonable to consider how buildings and building operations are regarded by those whose special business it is to provide for their protection from fire. The recent issue of new editions of two small works on this subject by the commanding officer of the London Fire Brigade,[1] offers a tolerably complete presentment of the fireman's view of building. It is a somewhat curious study for those accustomed to regard buildings in regard to architectural effect or to their provision for comfort as habitations, or their convenience for the carrying on of business, to go through a treatise in which buildings are regarded entirely in reference to their possible behavior if set on fire; and perhaps the architect, on his part, may find something to criticise in the recommendations of the fireman, over and above the general criticism that, after all, but a small proportion of buildings that are erected are actually burned, or even stand much chance of being burned (theatres excepted), and that, therefore, the provision against danger from fire cannot be allowed to override too much the immediate objects of architectural effect or practical convenience for working.

On the other hand, it must be admitted that the consideration of buildings wholly in regard to their probable behavior under fire leads the author of "*Fire Surveys*" to incidentally touch on some defects in structure which are equally defects apart from any contingency of conflagration, but the mischief of which is specially illustrated and emphasized under the action of fire. In respect to such points the Biblical phrase, that fire shall try every man's work, assumes a new significance. The importance of having a solid foundation and basing a wall properly upon it is certainly emphasized by the dictum of a writer of such long practical experience in the ways of buildings under fire, that the principal cause of walls "tumbling about" in a fire, thereby additionally endangering the lives of the firemen and adding to the difficulty of dealing with the fire, is in almost all cases traceable to the want of proper foundation. And in connection with this subject the author has some bitter remarks to make in regard to what he calls the "mysterious, unsatisfactory, and most expensive process known by the vague and unmeaning title 'underpining.'" The word, for that matter, seems to us to express its meaning well enough, nor is the process by any means necessarily either mysterious or unsatisfactory; but we have no doubt that there are not a few cases in which it is, in Captain Shaw's words, "nothing more or less than a trick or device to hide what is in every case at least a damage, and, as all firemen of experience have frequently and bitterly experienced, in many instances an imminent and serious danger." The ordinary builder and his foreman no doubt attach a kind of superstitious reverence to what they call "underpinning," which with them often amounts to no more than curing a bad foundation by carrying a wall farther down into one which is no better. It is like the elephant of Hindu mythology which stands on the tortoise, while there still remains the question, What does the tortoise stand on? Captain Shaw's fling at "this process, or trick, or device" will do good if it leads any building owners (or builders) to consider the matter a little more philosophically, and to reflect that the supporting wall introduced below is not necessarily any firmer basis unless it plants its foot in turn on a firm foundation. But if that firm foundation be secured either by coming down to rock or other firm natural bed, or by adequately-executed concreting, there is no reason why underpinning should be a delusion. We quite agree, however, that to underpin a single building of a row or block while the rest "is allowed to go on in its natural process of sinking," is only likely to result in unequal settlement of the walls and consequent cracks and further weakening. In such cases, where there is a division of immediate ownership, safety can only be attained by the intervention of public authority; and when our building legislation next comes to be revised, it may be desirable to consider whether any future form of Building Act should not regulate the conditions of underpinning somewhat more in detail, instead of merely requiring a general notice to the District Surveyor or other analogous official. If Captain Shaw's representations bring about more careful attention to this matter of underpinning and its effects on structural stability he will have done good, though it by no means follows that all underpinning is as useless or dangerous as firemen appear to suppose.

We referred the other day to the difficulties experienced at a fire in Melbourne in dealing with very lofty buildings, and Captain Shaw urges the same consideration. The risk of a building is said to be, in general terms, in direct ratio to its cubical capacity: so much more space, so much more chance of something getting on fire, so much more space for fire to develop, and, in general, so much more bulk of material for it to feed on. But beyond a certain height the fire-risk increases also with the height, as the fire-extinguishing and life-saving appliances now available are inefficient or useless above a certain height. This may be added to the reasons already adduced of late for taking some steps to limit the alarming tendency of town buildings to climb higher and higher. At all events, we are told, "persons who erect high buildings should invariably make their own arrangements for getting down externally to spots within reach of the ladders or other means of escape available from outside," and this means to a height of about forty feet from the ground, beyond which height life-saving appliances cannot be counted on at present.

In regard to walls, the fireman will be found to be dead against stone, as the very worst material that can be used in building. As far as the use of stone for so-called fireproof staircases is concerned, this is now matter of common knowledge, and it is in great measure owing to Captain Shaw's representations that this has been brought about; but he comments on the fact that the law still recognizes stone as fulfilling the requirements of a fireproof material for lobbies, stairs, etc., and that incalculable injury has been done by this piece of legislation, which ought to be reformed without delay; for though every competent architect and surveyor knows better now, the fact remains that in London a stone staircase complies with legal obligations, and the surveyor has no power to disallow it; and though every one knows now (thanks, again, mainly to Captain Shaw's former publication of his experiences) that an oak staircase would resist fire far better than a stone one, and remain longer in a safe condition for use in a fire, yet in any public building in progress we are still liable to see the spectacle of the district surveyor solemnly condemning and ordering out a wooden staircase, and demanding the substitution of a stone one, according to law. This is one of the matters which the County Council will be expected to look to before long.

It can hardly be expected that architects will accept Captain Shaw's dictum that "copings, balconies, cornices or other projections should never be constructed of stone, as this material is certain to fall down at an early stage of a fire, and is likely to kill both persons endeavoring to escape and those coming to render aid." This is the fireman's view of architecture with a vengeance: that because a building might some day be burned, and in that case stone cornice-blocks or corbels would fall, therefore all buildings are to be shorn of whatever architectural enrichment and effect is to be gained by oversailing stonework. That is an example of the unreasonableness of specialists, who can see things from no point-of-view but their own. The caution that walls constructed of stone alone are often found to stand better than those of stone with brick backing is more to the point; the different behavior of the two materials under fire may have an even worse disintegrating and twisting effect than results in a wall entirely of stone. Captain Shaw's opinions about the bonding of walls are much open to question. In "*Fires in Theatres*," he remarks (page 6) that "it is a great mistake to have a number of internal walls merely touching the external ones, and not bonded into them or in any way contributing to the support of the structure." Where has Captain Shaw seen walls built thus? From another passage, however, in "*Fire Surveys*," we gather that the fireman's notion of bonding one wall into another is that "an external wall should be firmly tied to party and return walls by strong wrought-iron anchors, of sufficient strength and number to keep the whole of the building firmly fixed without the assistance of floors, roofs or internal ties of any kind." The fireman's great desire is that the walls should be independent of floors, so as not to collapse when floors fall in, and he wants to be sure that the front wall will not part from the cross-walls during fire. Now, if we were providing for a building which was probably to be burned in a year or two, Captain Shaw's "anchors" might be accepted as an additional security against the parting of the walls; but as, after all, we construct buildings with the intention that they shall last many years and *not* be burned, we should object to the "anchors" as introducing an element of decay into a structure otherwise of permanent materials. Captain Shaw is alive to the danger of wood bond, but sees none in hoop-iron bond or in his proposed "anchors"; but iron is always an element of decay in a wall, and, besides, if the wall gets greatly heated in the fire, the iron within may itself get heated sufficiently to act as a destructive agent in cracking and twisting the wall. Ordinary brick bond may, no doubt, be insufficient, from the fireman's point-of-view, between walls meeting at right angles; but a stronger bond than the iron anchors, and one not liable to be affected by fire, might be formed by employing long tailing-pieces of concrete every few courses, built in cement into the cross-wall, and with a short cross-head, formed in the same piece of concrete, bedding on the front wall, and even (for greater security) with square joggles formed on the under side to tooth with the courses of bricks. The tensile strength of the concrete blocks would not support the weight of the outer wall if applied vertically, of course, but it would be ample to prevent the wall settling out of the perpendicular and away from the cross-walls in the first instance, and it would form a permanent element of strength in the wall. That is how we should provide against the fireman's dread of the walls parting, and he might go safely on brick walls thus bonded. But metallic bond is

[1] "*Fire Surveys, or a Summary of the Principles to be Observed in Estimating the Risk of Buildings.*" By Captain Eyre M. Shaw, C. B., London Fire Brigade. Third Edition. London: Effingham Wilson & Co., 1889.
"*Fires in Theatres.*" By Eyre M. Shaw, London Fire Brigade. Second Edition. London: E. & F. N. Spon, 1889.

mainly the resource of careless and cheap building: scamp the wall, and then tie it up with bandages. No good comes of that.

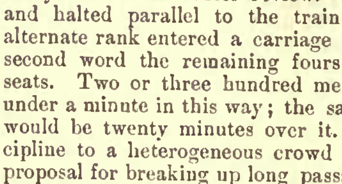
In reference to this question of stability of walls, Captain Shaw wonders why strength in a long wall is not oftener sought by building it on a zigzag plan. There are many cases, he thinks, "in which the loss of space, loss of material, expense of construction and inconvenience of approach would be much less with a thin, zigzag wall than with one of those massive, costly walls so commonly found, with enormous buttresses blocking up approaches and occupying space." Probably the principal reason against it is that, in spite of the opinion expressed in the above quotation, a wall so built would be regarded by most people as ugly externally and inconvenient internally. We knew of one instance of this construction being employed in the side of a large saloon, by a gentleman who was "his own architect," in a building which actually was burned, and where Captain Shaw and his gallant band "assisted" at the catastrophe, but how that wall behaved under fire we did not learn. The idea, however, is one to be kept in mind, for it may be convenient in some situations, and, moreover, it has its architectural possibilities. In regard to the relation between floors and walls, the fireman's view is that floors should be quite independent of walls, and he is apparently as anxious that floors should *not* be bonded into front-walls as that cross-walls should be. As long as the floors are of materials inflammable or liable to be twisted or injured by fire this is quite right; they must come down, and in coming down they tend to pull the walls down. But with floors which are as fireproof as the walls (and floors can certainly be made so now), the building of the floors into the walls ought to be a great source of strength to the whole structure in fire. But the whole matter of fireproof floors is passed over in this recently-published new edition of Captain Shaw's book with the most extraordinary indifference. There is a great deal said about the various species of wall that stand fire best, but little or nothing as to the various important forms of fireproof flooring which have been brought out of late years, on which the opinion of the fireman might be of value. We are urged to arrange buildings so as to "divide the risks" as much as possible; *i. e.*, to divide the building into separate compartments, so that fire beginning in one of these cannot easily spread to another; but all this is said apparently in relation to horizontal division only, and the immensely important aid in subdividing risks which may be afforded by fireproof floors built into the walls is practically ignored. This looks as if the production of the new edition of the book had been carried out in a somewhat perfunctory manner, and without much trouble to bring it up to date in regard to the present possibilities of fire-resisting construction. The new edition of "*Fires in Theatres*" seems to be similarly not brought up to date. There is a great deal in it as to the possibility and importance of shutting off the stage section from the auditorium, and about the arrangements to be observed in the stage section for minimizing fire-risk; but there is no reference whatever to the absolutely new construction of several theatres lately with incombustible materials in the auditorium — an important move in the direction of fire-resistance (whether best for acoustics is a separate question) which seems really to have escaped Captain Shaw's notice. At all events, he practically ignores it.

It is worth note that the author states that, when it is impossible to fix iron doors to cut off communication, light revolving iron shutters, which can be drawn whenever the opening is not in use, are a considerable check to the passage of fire, and worth fixing with that object. In reference to iron, it is stated as a matter-of-fact and experience that solid iron columns are much more capable of resisting the effect of heat than hollow ones, a result which we should think by no means improbable; but which need hardly be regarded as affecting the usual form of construction of cast-iron columns, inasmuch as no one who knows what he is about would now depend on iron columns of any make in a building which he wished to regard as fire-resisting. The at first sight rather extraordinary recommendation that "circulation of air should on no account be permitted in any part of a building not exposed to view, especially under floors," etc., means really, we presume, that there should be no concealed spaces; an opinion we expressed not long since on sanitary grounds; and we find that Captain Shaw, from this point-of-view, is as critical as we were, for slightly different reasons, in regard to the evil of leaving between the roof and the ceiling "a large space to which access is difficult, and which may consequently conceal the elements of danger until they become serious"; a sentence as true in regard to danger from fire as to danger from accumulations of unhealthy matter. "It is difficult to understand," Captain Shaw sarcastically adds, "the principle on which those persons act who, after constructing and covering-in for themselves a building of a certain size, deliberately deprive themselves of the use of a large portion of it." The principle on which they act is the principle of the truss; and there are cases where, while this principle is constructively necessary for spanning the space, it is not convenient, either as regards warmth or appearance, to leave the roof open to the rafters; but we entirely concur, and have already expressed our strong opinion, that these roof-spaces should always be easily accessible, and sufficiently lighted to see what is going on there. In most cases they could be turned to practical use with but little extra expense.

A great portion of "*Fires in Theatres*" is historical, and in that sense of considerable interest, though not exactly coming into the scope of this article; and, of course, a good deal of the ground in regard to fire-resisting construction is covered by the general recommendations in "*Fire Surveys*." In regard to other considerations, two or three points present themselves as prominent. One is the employment of firemen in theatres, in regard to which Captain Shaw rightly condemns, and contemns, the device of merely dressing an ordinary workman in a special costume and calling him the fireman; but he is rather inconsistent in his recommendation as to what should be done. He says he has pointed out to managers three courses: (1) the attendance of a staff of public firemen at the managers' cost; (2) the permanent hiring of properly-trained men to act as firemen; (3) the appointment of skilled firemen to confidential posts in the theatre — killing two birds with one stone, in fact. But almost in the same breath he admits that the cost of the two first systems is prohibitive, and all he can say for the third is that there are objections to it on the part of managers which "ought, if possible, to be overcome." In regard to fire-resisting metal curtains between the audience and the stage, the author rightly says that "in the present state of mechanical skill and knowledge it is simply monstrous to say that the thing is impossible"; that it is easy to make and fix a curtain that fire would not get through for an hour, more than time for saving the audience. Such a curtain should, in our opinion, be down before the opening of each performance, so as to ensure that it is in working order; it need not be used for the acts; it is sufficient that it is lowered and raised before each evening's performance. In regard to further means of shutting off fire, the author recommends not only the now usual iron doors between the stage section and the auditorium, but iron doors between the auditorium and the lobbies, which latter, with the staircases, should be sufficient to contain all the audience who can be seated within the house. He speaks of the security given by "immediate exit" from the auditorium into the lobbies, with these doors closed behind the retiring audience; but then that word "immediate" raises the question as to the movements of the audience themselves. As Captain Shaw says, if one man at the top of a theatre heard an alarm of fire he would run down and save himself easily, and "at first sight there appears no particular reason why a great many should not be able to do so as well as one." The difficulty is not only in the tendency to excitement, which Captain Shaw refers to, but in the fact that the movements of a heterogeneous crowd are not even or rhythmical. If they could, under any word of command, assume a uniform pace and formation, they would be out nearly as quickly as one man. We remember much admiration being excited by the manner in which the commander of a company of volunteers got his men into the train one year for the Easter review. The men were formed four deep and halted parallel to the train; at a word of command each alternate rank entered a carriage and occupied the front seat; at a second word the remaining fours entered and occupied the back seats. Two or three hundred men might be got into a train well under a minute in this way; the same number as an irregular crowd would be twenty minutes over it. However, we cannot apply discipline to a heterogeneous crowd on the instant. Captain Shaw's proposal for breaking up long passages by barriers, at such distance as would include fifty people between each, is a kind of step in the direction of an enforced discipline; one person only being able to pass at a time, there could be no great and increasing pressure in any section. There would be a great deal of grumbling at the barriers under ordinary circumstances, and it may be argued that in a fire they would be a serious impediment to quick exit; but the supposition is that the theatre is so constructed as to leave plenty of time, and the real danger then is from a rush. We commend to the builders of theatres Captain Shaw's remarks on staircases; on the use of handrails, in passages as well as staircases, as affording a chance of checking a rush and preventing falls; on the value of turns in staircases, and the danger of a long straight staircase, a feature to be found in some of the most recent and advanced theatres, and which we have always regarded with suspicion.

The theatre book, in spite of the omission to take into account the latest manner of construction, as an admirable one. But we think that "*Fire Surveys*" required a good deal more re-editing than it has received, and that before another edition is called for the author might do well to discuss some of the matters referred to with those who have more scientific knowledge of construction than he would probably lay claim to. — *The Builder.*

RESTORATIONS IN ITALY.



THE preservation of the antique character of the Italian cities seem to be of so much less importance to their inhabitants than to outsiders that it is highly probable that, if the municipalities only were to be consulted, the limits of renovation would be the ability to raise money. The power exercised by the archæological authorities is applied with as much energy as discretion, and it is quite sufficient for the Ministry to be informed by any responsible person that a monument is threatened to have an inspector of antiquities sent to examine the case and stop any injury to it. In this way the scouring of the sculpture on the Duomo of Florence was

stopped on the warning of the *Cornhill Magazine*, to the intense indignation of the *bourgeois*, who hoped to see the whole exterior of the church as bright as a bride cake. I was able in this way to stop the destruction of the *quadrivium* of Giovanni Pisano at Rieti, which was in the way of widening a street, and to stop the renovation of the pulpit of Donatello at Prato, which was already in the hands of the scraper.

The large cities have been for the last few years in a fever of *sventramento*, opening up, and certainly in some cases it is not only justifiable, but demanded by the most imperious sanitary considerations. In Naples, for instance, it can hardly be carried too far, as in the architecture of that city there is almost nothing worth preserving; but the fever has spread to Venice and Florence, where immense injury might be caused by the operations of a modern engineer.

The plans in Venice included a broad street from the railway station to the Piazza S. Marco, and the demolition of all the picturesque Riva from the Riva dei Schiavoni to the public gardens, and the construction of fine modern buildings along the whole line. The latter part of the project brought the whole body of artists, Italian and foreign, up in protest, as, without its artistic attractions, Venice would be in a more miserable state than it is now, the clamor raised in behalf of this remnant of the old Venice which furnishes half the pictures painted there, stopped the measure in the Council after it had gone through the Giunta, or Grand Committee; but the other, for the wide street, passed without serious opposition. It will be a satisfaction to us to know that the Government refuses its consent to this invasion on the unique character of the city. Venice needs no *sventramento*, but it would be the better for a little cleaning in some of its historical precincts, such as the court of the house of Marco Polo, and the covered way that gives access to it from the canal, which is generally in a pestilential state. But any demolition, except for instability, would be sacrilege.

As to Florence, one is apprehensive of the effects of any touch on its time-honored walls. But neither sea-air nor sea-tide does for it what it does for Venice, and the tendency to typhoid, which has caused trouble to its sanitary authorities and loss to its finances, demands the adoption of measures to prevent it.

What has been decided is to demolish the entire block between the Via di Porta Rossa on the south and the Via dei Cerretani on the north, the Via dei Calzaioli on the east, and the Piazza degli Strozzi on the west; to enlarge the Piazza dei Mercato Vecchio to double its present extent, reaching as far as the southern limit of the Piazza S. Andrea; then running wide streets from the Via dei Speziali to the Via dei Strozzi, Via di Or S. Michele to Vicolo dei Strozzi, Via della Nave to the Via dei Corsi; and from the Volta dei Pecori to the Via Tornabuoni, through the Via Teatina, and across these others from the Piazza S. Maria Maggiore to the Torre de Foresi, Via dei Naccioli to the Via di Pelliceria, and from the Palace of the Arcivescovate to the Mercato Nuovo. But the houses on the Via Calzaioli and all the historic houses will remain undisturbed and all the old houses on the Via di Porta Rossa. These will all be disengaged from the more modern incrustation in which most are hidden. The Loggia of Vasari in the Mercato Vecchio has been taken down and will be reconstructed in the vicinity of the new fishmarket. The *risanimento* of the "centre" of Florence can raise no reasonable alarm in the mind of any lover of the city, though the work of reconstruction must be carried out with great judgment to avoid the disfigurement of it. The sanitary advantages leave no room for discussion. At the same time nothing really worth preserving, historically or architecturally, will be disturbed, but will, on the contrary, be better seen by being insolated more. — *London Times.*

SOCIETIES

THE DETROIT ARCHITECTURAL SKETCH CLUB.

THE last competition of the D. A. S. C., — for a newel-post, hand-rail and balustrade in hard-wood — known as the "Scott Competition" (for the reason that Architect John Scott offered prizes to successful competitors) was awarded as follows: R. Mildner, 1st, A. Kalm, 2d, and Max Grylls, 3d.

The next competition will be for a set of Hardware for a door, for which Messrs. Hopkins & Dickinson offer cash prizes of $15.00, $10.00, and $5.00.

At the next regular meeting the subject of drainage will be discussed. Very respectfully, C. A. FULLERTON.

SHORT FACTS ABOUT ALUMINIUM. — After being cast, aluminium has about the hardness of pure silver, but may be sensibly hardened by hammering. Its tensile strength varies between 12 and 14 tons to the inch. Comparing the strength of aluminium in relation to its weight, it is equal to steel of 38 tons tensile strength. The specific gravity of cast aluminium is 2.58, but after rolling or hammering this figure is increased to about 2.68. — *Journal of Commerce.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

BLUE-PRINTING ON A WHITE GROUND.

LOS ANGELES, CAL., October 29, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Would you kindly inform me in what number of the *American Architect* appeared a process of blue-printing by which a blue line was produced on a white ground. If you can give the information you will confer a favor on

Yours respectfully, GEORGE M. THOMSON.

[ONE of several methods will be found described on page 58 of the issue for August 1, 1885. — EDS. AMERICAN ARCHITECT.]

THE SUPERVISING ARCHITECT.

EAST GREENWICH, R. I., November 11, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you please inform me who is the head of the Architectural Department at Washington.

Yours truly, H. B. INGRAHAM.

[MR. JAMES H. WINDRIM, F. A. I. A., of Philadelphia, is Supervising Architect of the Treasury Department. — EDS. AMERICAN ARCHITECT.]

BOOKS.

BROOKLYN, N. Y., November 11, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — Can you inform me of the best works on stereotomy and stone vaults and groinings? Respectfully yours, R. B. EASTMAN.

[PROBABLY the best thing you can consult is Viollet-le-Duc's "*Dictionnaire*." Articles "*Voute*," "*Construction*," "*Coupe de Pierre*." C. E. Greene's "*Arches in Wood, Iron and Stone*," published by John Wiley, of New York, at $2.50, is standard; so, too, is Dobson's "*Masonry and Stone-cutting*." — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

OLD LONDON BRIDGE. — The first stone bridge across the Thames at London was commenced in 1176. The architect was Peter of Colechurch, who died in 1205, one year before the structure was completed. The stone platform was 926 feet long and 40 feet wide. The coping stones were 60 feet above the level of the water at ebb tide, and the bridge was formed by nineteen pointed arches, with massive piers from 25 to 34 feet in solidity, having a draw-bridge on each side of the river to protect the approaches. The chapel inscribed to St. Thomas à Becket consisted of two stories and was familiarly known as St. Thomas of the bridge. It stood on the tenth or great pier, that is, as nearly as possible in the centre of the bridge, the lower portion being the crypt, paved with black and white marble. In this crypt the architect, Peter of Colechurch, desired that his bones might rest, and there, it may be presumed, they peacefully remained for centuries. But in 1737 the premises came into the occupation of a Mr. Yaldwin, to be used by him as a dwelling and warehouse. While alterations were being effected under the staircase of the crypt the remains of a human body were discovered and removed, but no inscription was found to afford a clue as to whose body it was, nor were any records of the interment forthcoming. In the summer of 1883 old London bridge was removed. I was at school in Kensington at the time, and hearing that the crypt which once contained the remains of Peter of Colechurch had been discovered I hastened to view the ruin. Admission to inspect was denied to a boy, albeit of archæological proclivities, and I was fain to watch the process of demolition from the nearest buttress of the London bridge now standing. However, I secured a print, which I still retain, showing the chapel of St. Thomas and the crypt let to Mr. Yaldwin in the last century. The questions, therefore, remaining to be solved are: 1. Who completed the old bridge when Peter of Colechurch died in 1205? 2. Of whom were the remains discovered in the tomb under the crypt stairs in 1737, and where were they afterwards placed? — *St. Louis Post-Dispatch.*

THE "JERRY-BUILT" HOUSES OF ROME. — On the outskirts of the Ghetto a long street led to the Portico of Octavia, where Titus celebrated his triumph and Syrian captives bore the spoils of the temple in his train. Close by the colonnade of this noble ruin the ancient fishmarket, which had been held here for centuries, might still have been seen a year or two ago. The sight was strikingly picturesque. The many-storied houses of the narrow street almost shut out the blue sky overhead, and the sunshine streamed through the meeting roofs on the glittering scales of fish and the worn marble slabs which had been in use since the days of the Cæsars. A few steps farther on was the theatre which Augustus built in honor of the young Marcellus. Here we were met by another of those strange contrasts over which Ampère

loved to moralize. Under the Doric arches of the lowest tier artisans had their shops, and the ruddy light of the forge glowed upon piles of green vegetables and watermelons and joints of meat which dangled from the travertine blocks of the Augustan age. Above the Ionic arches of the upper story rose the grim walls of the Savelli Palace, built in the Middle Ages on a lofty heap of débris within the theatre. This was the home of Niebuhr when he lived in Rome as Prussian Ambassador. From these windows he looked down on the fountains, the orange trees, and flowering jessamine of his little garden, and far away across the Tiber to St. Peter's and Monte Mario. This district has undergone a thorough cleansing. The ancient fish-market and the shops have been removed, and the Ghetto levelled to the ground. Whole streets were carted away last year amid clouds of white dust and mortar. Only the fortress-looking walls of the Cenci Palace, the Portico of Octavia, and the Theatre of Marcellus remain, isolated and stripped of their surroundings. In short, the whole of this remarkable quarter has disappeared to make room for more boulevards and "jerry-built" houses. — *The Nineteenth Century.*

New Device for scouring away River Bars. — Several models of a new boat, built on the jetty plan for the purpose of washing out bars and new channels in the river, on exhibition at the Planters' House, in this city, are the source of much interest and enthusiastic comment by river men, who have taken especial pains to investigate the feasibility of the new candidate for Government favor. The affair is the invention of Grant Marsh, of the towboat "*R. A. Speed*," and has received such universal indorsement that St. Louis capitalists have taken the matter in hand, organized a company, and will put the scheme before Congress with a view of its adoption by the Government for future river improvements. The model represents a boat 300 feet long, 25 feet beam, 10 feet hold, constructed entirely of iron and containing a series of compartments, each provided with pumps. The machinery for motive-power as well as for the pumping-apparatus, being located directly amidships. The boat has no model, in the general acceptation of the term, but is the same depth of hold its entire length, being pointed at both ends, leaving probably 200 feet of straight hull. The operation consists in sinking one or a series of the boats, as may be necessary, at the point above the bar or channel to be scoured, where they remain until the new channel is complete, when they are pumped out and taken to other fields of operation. Upward of 100 steamboat men have examined the models in the past few days, the general verdict being that its adoption by the Government will completely revolutionize the present system of river improvement. Models will be shipped to-morrow from here to Louisville, Cincinnati and Pittsburgh. Capt. Grant Marsh, the inventor, is naturally highly elated over the prospects of his pet scheme, which he has covered with a patent. — *St. Louis Globe-Democrat.*

Cremation in France. — It will certainly take a considerable time before the French become familiar with the system of burning instead of burying their dead; but cremation may, nevertheless, now be said to have a recognized position in France, and to render a cremation popular — at all events with the humbler classes of society — everything has been done to make the process cheap. The Prefect of the Seine has just given his sanction to a tariff for burning the remains of persons who may themselves, or whose relations may, prefer this system to burial. A uniform and moderate charge of 50 francs is made, this including the right of depositing the ashes in a columbarium which will shortly be built by the city of Paris, and leaving only the urn, in which the said ashes are enclosed, to the cost of the relatives. Moreover, in the case of persons who are certified by the mayor of the commune in which they died to have been in very necessitous circumstances, no charges whatever will be made for cremating their remains, or for keeping, during a period of five years, what remains of the body after the burning process. Nothing is said as to what will become of the ashes at the expiration of the five years; but probably, as the bones of the dead are now every three, five or ten years, according to the length of lease of the ground, removed from cemeteries to the catacombs, so the ashes will be collected and placed in some general receptacle. — *London Standard.*

The Fate of One of John of Bologna's Works. — There is something about professors and clergymen which makes them particularly prone to consider themselves experts in criticism of the fine arts, and produces dire effects in colleges and churches. One of the most flagrant instances occurred a half-dozen years ago at Oxford. The front quadrangle of Brasenose College had as a decoration a group of fighting gladiators, one of whom has the other down on one hand and his knees, while he draws off to strike the almost prostrate foe. It was not in a costly material, being of lead, but it happened to be the only work of its kind by John of Douay, who in Italy, his adopted country, went by the name of Giovanni da Bologna (1524–1608). It will hardly be believed that the master and fellows of Brasenose sold this monument for old lead to a plumber, who melted it down for water-pipes! It is difficult to conceive of the mental condition of these worthies. Even if they saw no beauty in the figures and wished the group out of sight, one might have expected them to have enough interest in the monument as a piece of history connected with their college to preserve it in some less conspicuous place. But they bundled it off; into the melting-pot it went. — *N. Y. Times.*

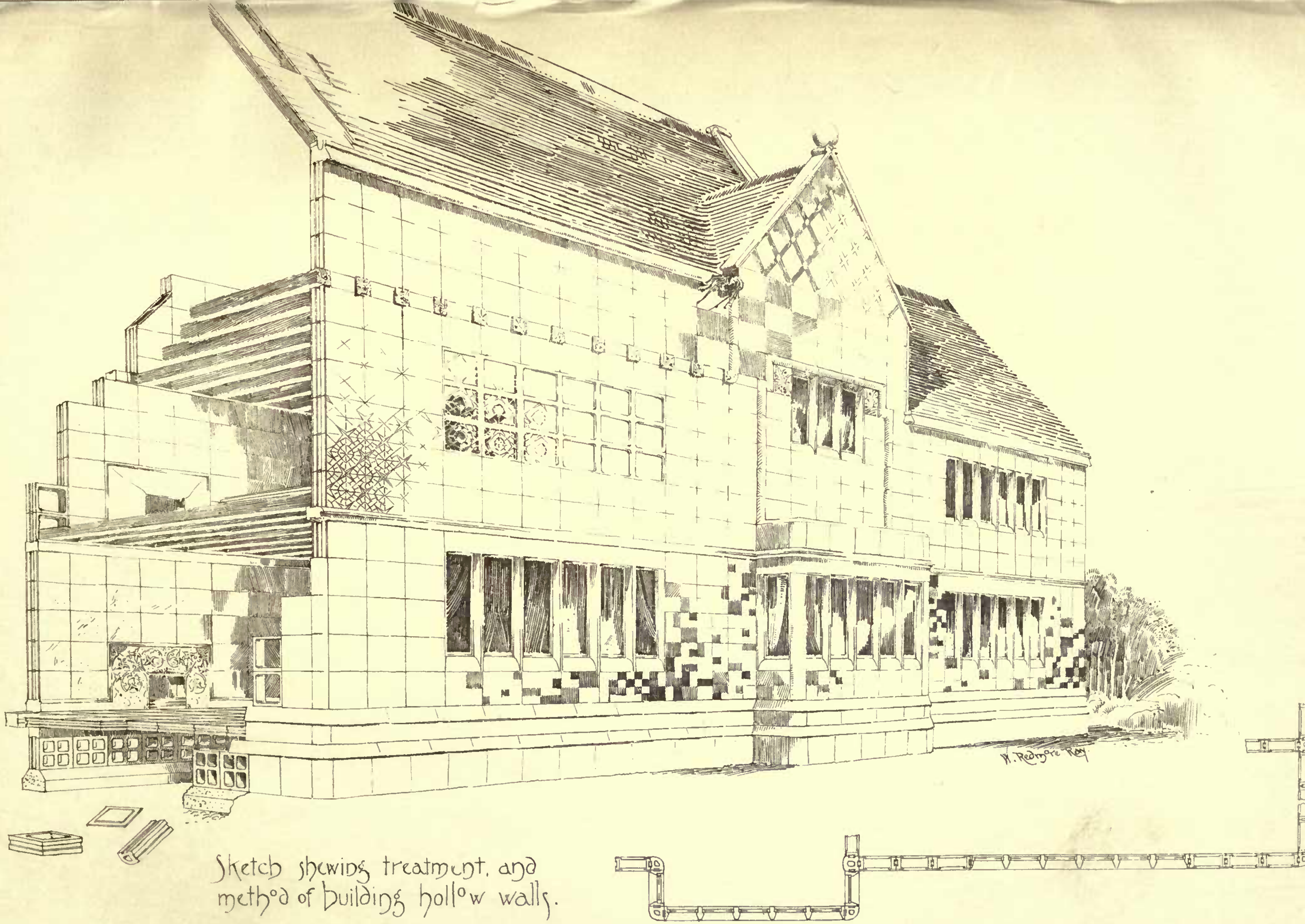
A Heavy Bellite Blast. — It is stated that a heavy blast has recently been carried out with the explosive bellite in connection with the Westport Harbor Works, New Zealand. It was desired to dislodge some 1,800 tons of rock, the mass being loose on three sides. A tunnel was cut about 15 feet into the rock, and chambers were formed to the right and left for a few feet at the end. In one of the chambers thus formed a charge of 125 pounds of bellite was placed, and in the other a charge of 75 pounds, making a total of 200 pounds. The report of the Government engineer of public works shows the blast to have been most successful. The shot, when fired, not only broke up the whole of the rock desired into convenient masses, ranging from 3 tons to 20 tons in weight, but its effect worked back through a large area. It is computed that, on the whole, instead of 1,800 tons, about 2,200 tons of rock were brought down by the 200-pound charge. This gives an average of 11 tons per pounds of explosive used, which is a very satisfactory result, and much higher than the usual percentage, although it is to be observed that the blast was located in a favorable position. On the other hand, it is stated that a smaller charge would have answered equally well, as the expansion of bellite is slower than that of dynamite. This comparative slowness renders its action more uniform, and distributes the work over a greater area, the action being less local. — *Invention.*

TRADE SURVEYS

One of the frequently-observed characteristics of the present commercial situation is the sure development of reactionary tendencies from any extreme pressure in any given direction. A threatened stringency in money last week is followed, perhaps, this week by easier conditions. Cornering combinations are broken up or disabled by unforeseen influences, which, somehow, dovetail into their contraries. The spirit of organization and of familiarity with the country's manufacturing and commercial needs are largely responsible for this protection. Within certain limits, these counteracting and protecting influences and tendencies can be relied upon by business men, but emergencies and conditions may arise when there will be no reaction, and it is this very feature which money-lending and banking interests are watching. The discomfiture of trusts, though technically, perhaps, due to other causes, is very largely due to the automatic workings of economic agencies. In many parts of the West there are some distressing symptoms of insufficient money, but it is hardly to be wondered at that out of the general rush of agricultural borrowers there should be a growing percentage of failures to make restitution as nominated in the lenders' bonds. Default has been made on large loans among farmers in some Western States, but it does not seem to be widespread. The makers of agricultural implements have, here and there, discovered that they have worked too fast for the cash-paying capacity of the markets they serve. The volume of business, as shown by railroad traffic and bank exchanges, continues at high-water mark, and the general policy of buying raw material away ahead continues. Prices rule high and firm in nearly all avenues. In cotton and woollen products and knit goods, the increased distribution due to cold-weather requirements is giving life to trade in jobbing and manufacturing centres. In boots and shoes, clothing and allied trades, more labor is reported employed than since last winter. Jobbers in the three or four Atlantic coast commercial centres all report extraordinary activity, and travellers speak of unusual activity also in retail circles. There is a more careful measuring of requirements by commercial and middlemen generally than ever before, and this fact gives manufacturers confidence that the demands presented from day to day and week to week are altogether legitimate, and not in the least speculative. Manufacturers everywhere have this sort of faith in demand. A glance at the iron trade shows that demands are expanding and that production is increasing. New blast-furnaces are either projected or under construction in eight States, and since September 1st as many as twenty furnaces have been talked about which it is yet too early to announce as projected. Some of the sites are in Southwestern Virginia and Southeastern Kentucky. The rush of capital southward has not been discouraged by poor dividends, although in some political circles hints amounting to threats are sometimes thrown out in the direction of the repudiation of debts. The new industrial spirit of the South takes no part in such half utterances, and will never permit them to reach authoritative expression.

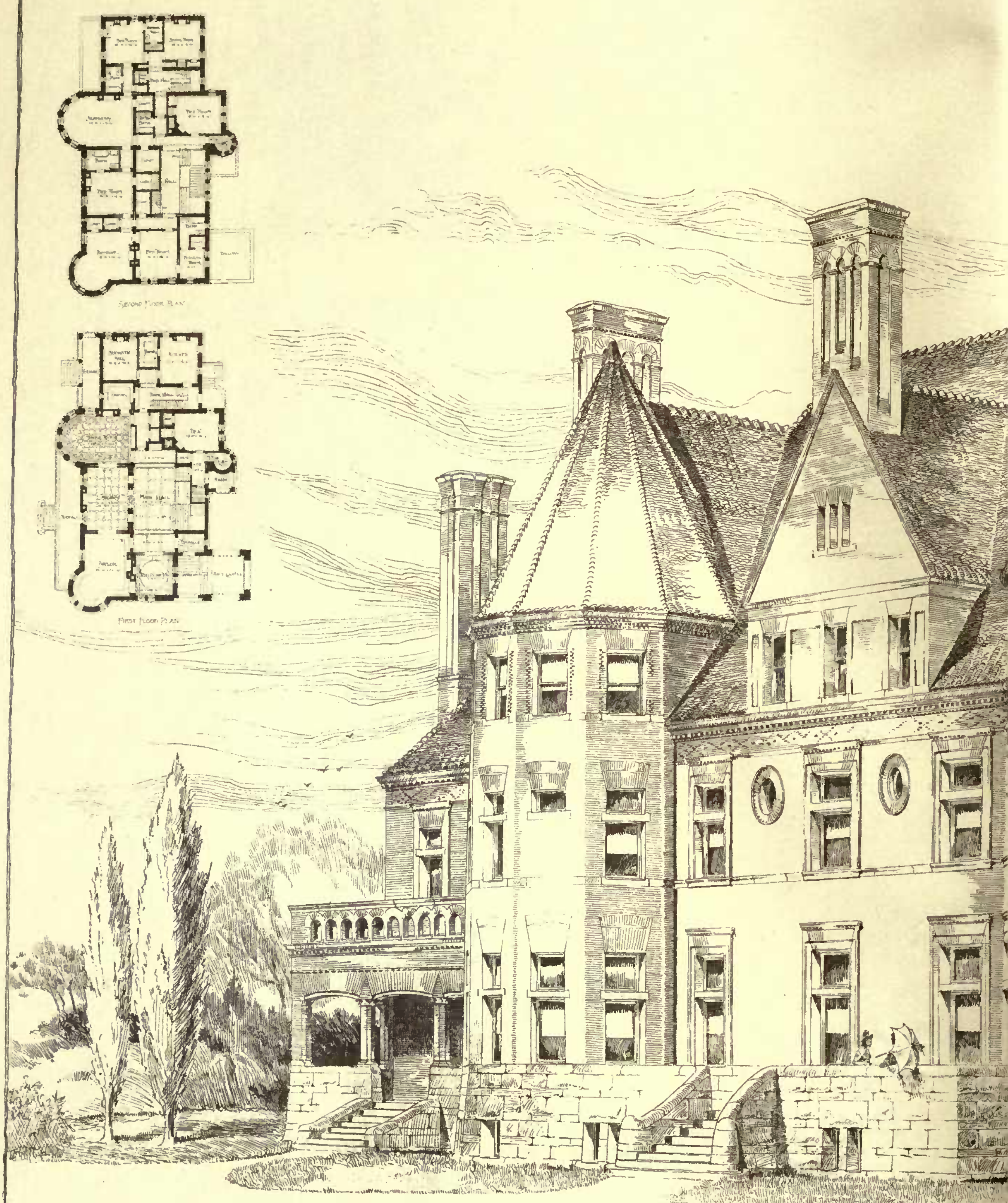
Measures are now being taken among some commercial bodies in the South to create still more friendly relations with the controllers of Northern capital, and many new and inviting opportunities are soon to be opened. The lumber trade both North and South has been so encouraged this year by the volume of business, if not with the margins, that more winter preparatory work will be done in the gathering of stocks for the demands of the next season. The pushing of yellow pine in Northern markets is largely due to the acquired interests in Southern timber properties of Northern capitalists. The ore-mining interests of Lake Superior have attracted much capital this year, as well as the gold, silver and lead mines of the farther West. Irrigation schemes contemplating the outlay of large sums, and the acquirement of now almost valueless lands, have been about completed. Reorganization schemes affecting railway properties hitherto non-productive seem to be reaching a climax, without a scaling down of capital. Numerous manufacturing combinations throughout the interior are in progress looking to the coöperation of hitherto isolated interests. Railroad-building schemes are still fermenting, with probabilities favorable to the inauguration of extensive new railway-building enterprises. House-builders have thus far this year found waiting buyers for about all the brick-and-plaster shelter they have established. Architects, so far as they have been recently consulted, express an opinion which leans decidedly to another active building year. Building and loan associations are multiplying far away from the scenes of their boyhood, and the impetus which this coöperative system gives is felt in all new rising industrial communities. In foreign industrial centres, or most of them, labor is in better and more constant demand than for years, or, for that matter, since the dawn of the industrial era, and the masses abroad are giving much attention to social and economic questions. Ship lines and cheap travel will do more to remove causes of unrest than all other influences combined. European employers are doing more than American employers to make conditions easy for labor. The condition of wage-earners is becoming more uniform. Small shops and factories have been multiplying at a very rapid rate this year, and it is estimated that the number this year is about double that of last. The equipment and furnishing of these multitudinous concerns helps to make business what it is. While they find work, the larger industries will have no cause of complaint. While crops are good all will be well. Possibly bad crops will never extend all over the United States as they have over the United Kingdom and certain portions of Europe for years, but should crops be generally bad a sudden halt will come to all these booming towns. The equilibrium between shop and farm has been delicately maintained for years, but should Nature knock the scales out of balance, there will be a repetition of past experience in declining trade, wages and general prosperity.

S. J. Parkhill & Co., Printers, Boston.



Sketch shewing treatment, and method of building hollow walls.

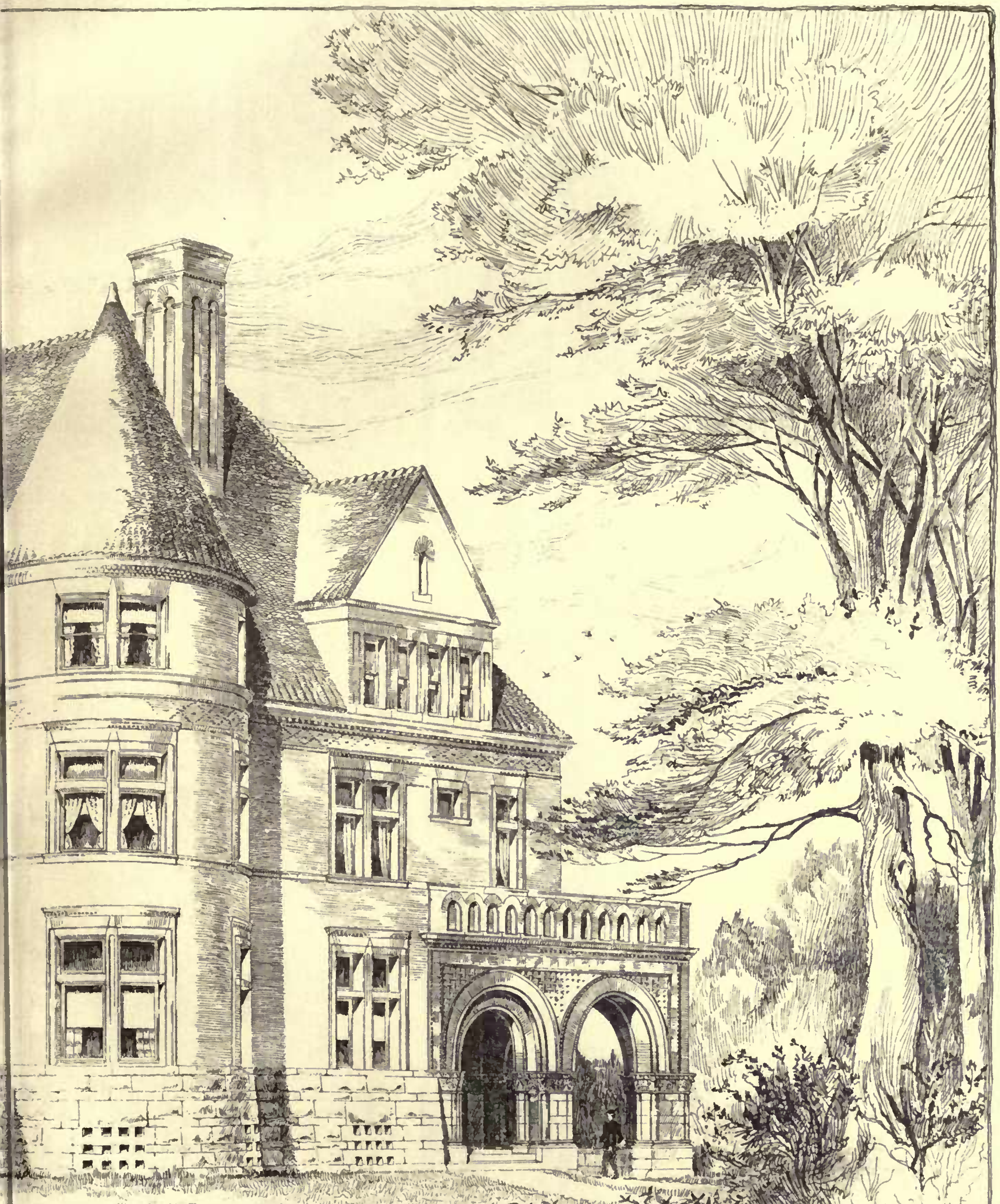
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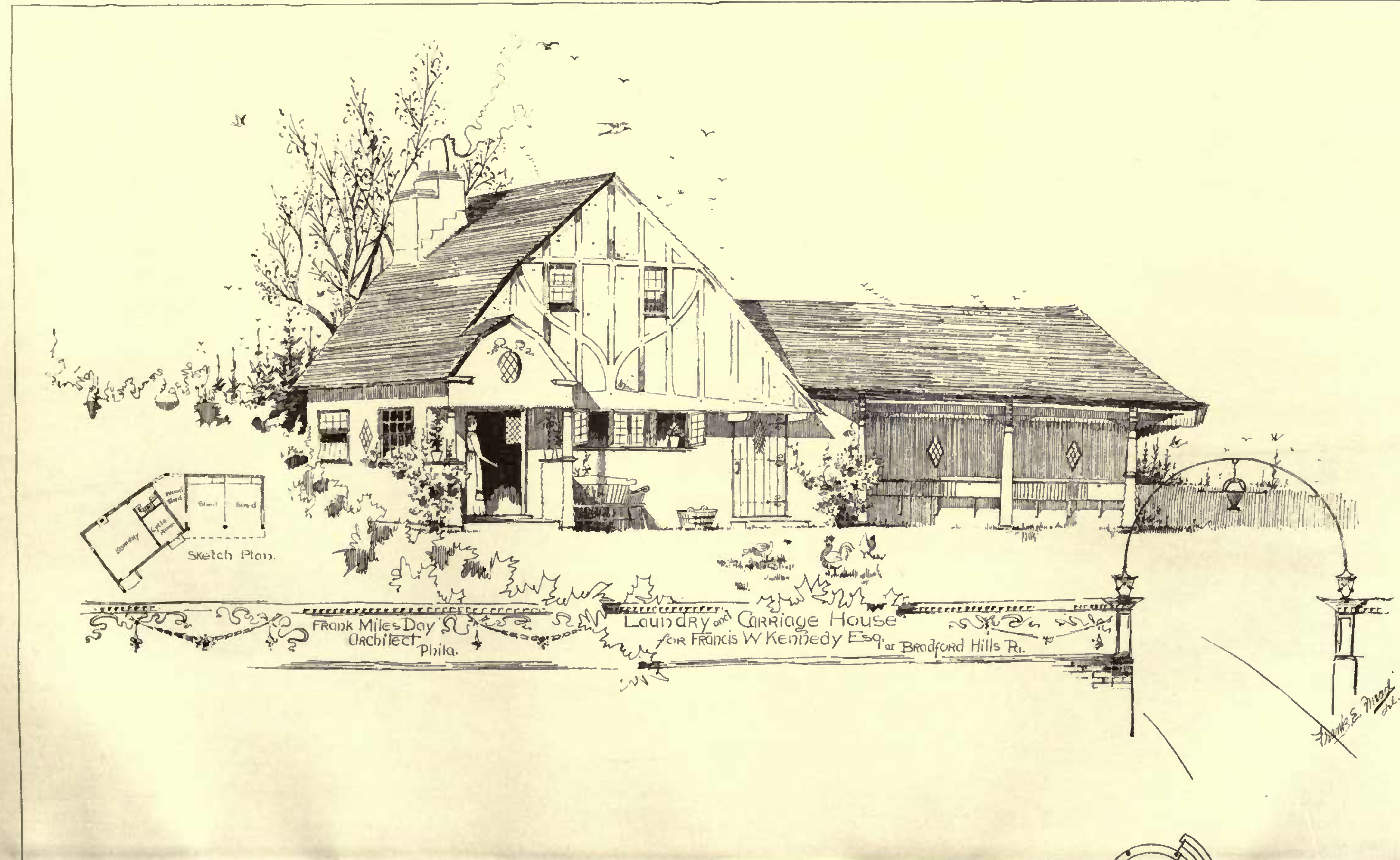
House. for. Mr. Wm. Hamlin: Buffalo. N.Y.

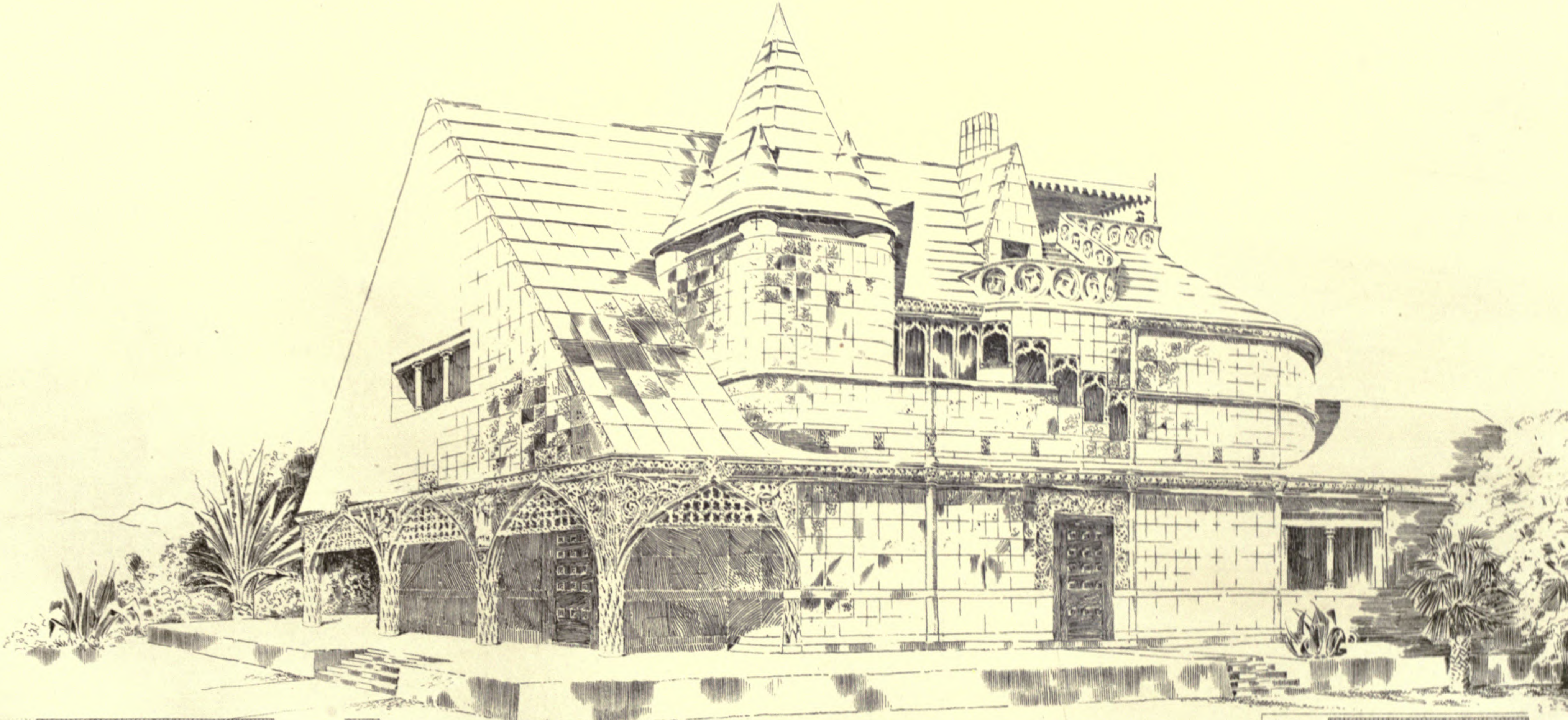
Messrs. Marling & Burdett. Architects. Buffalo.

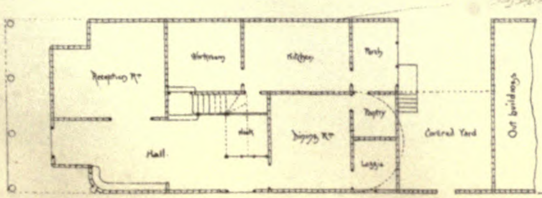
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Heliotype Printing Co. Boston

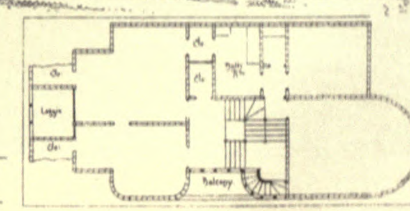

Sketch Plan.
Laundry
Cycle Room
Wood Shed
Shed
Shed
Frank Miles Day
Architect
Phila.
Laundry and Carriage House
for Francis W Kennedy Esq. at Bradford Hills Pa.
Frank E. Wood del.

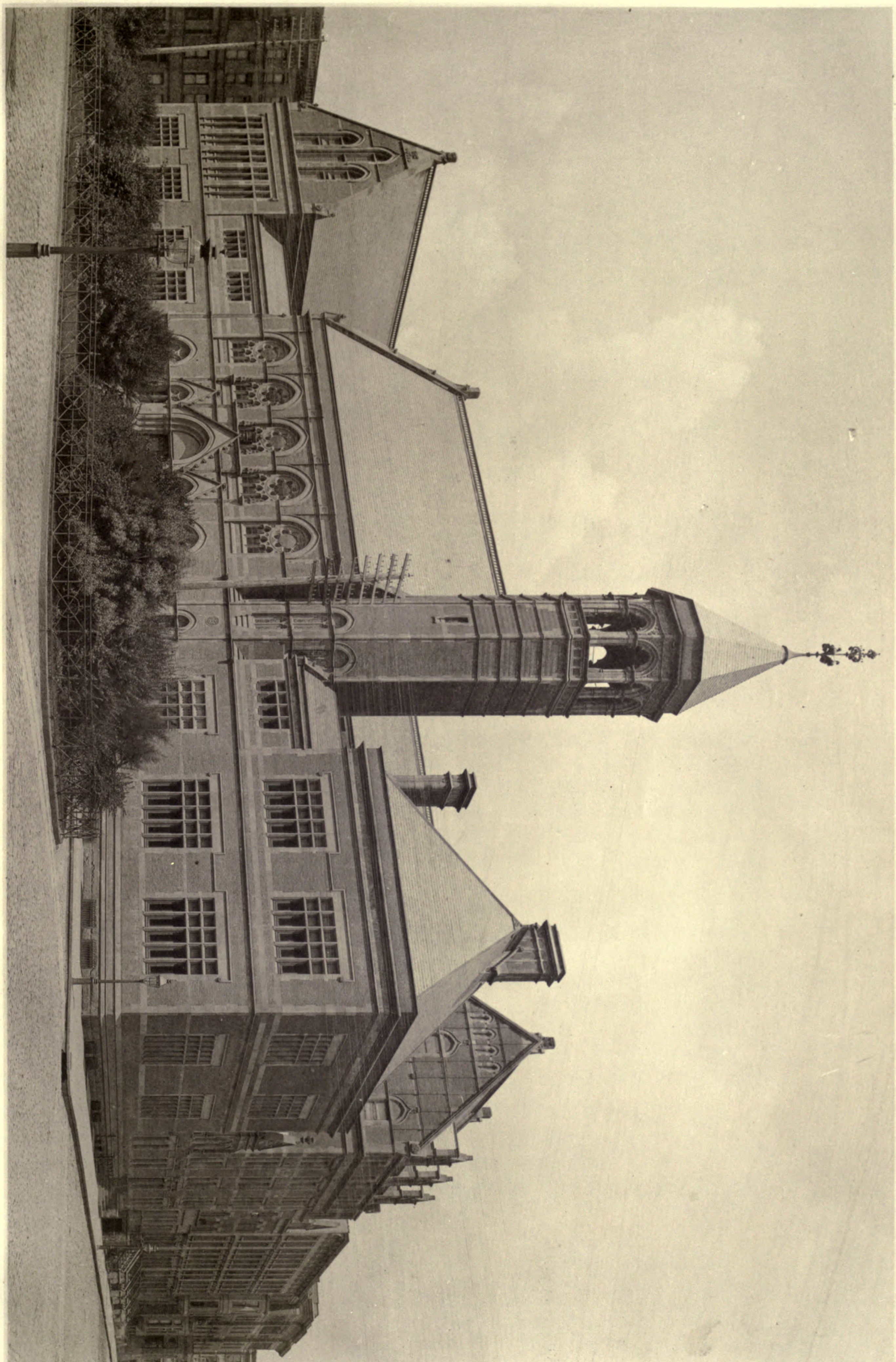




Suggestion for Residence in Hollow block method

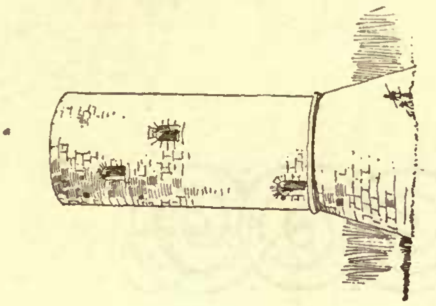
W. Redmore Ray. Invt et delt



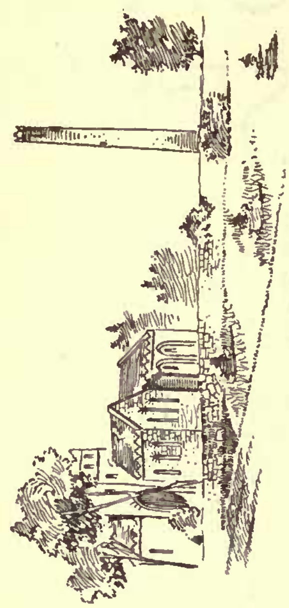


UNION THEOLOGICAL SEMINARY, PARK AVENUE, NEW YORK, N. Y.
LORD & POTTER, Architects.

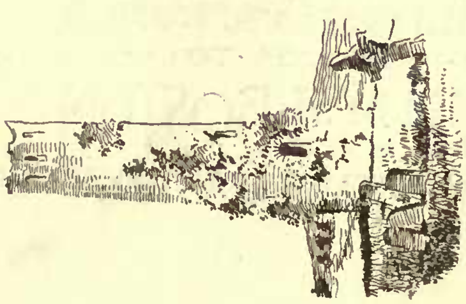
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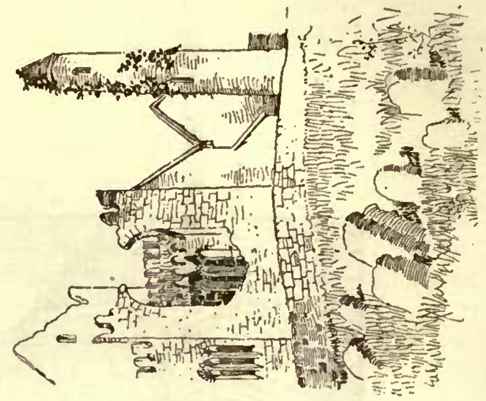
Brunless.



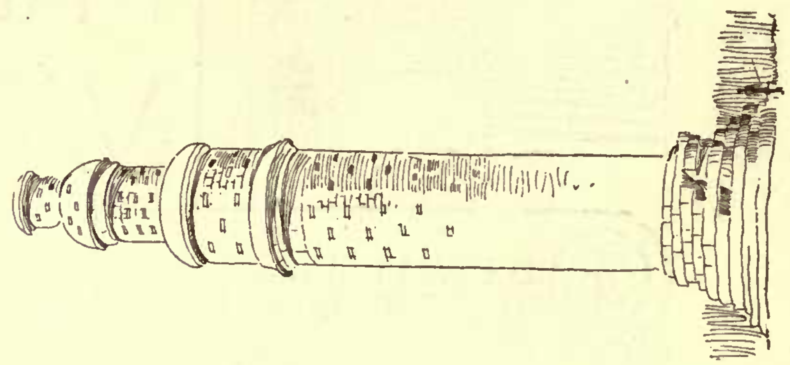
Kildare.



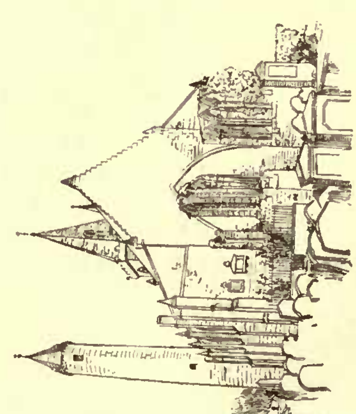
Clonmacnoise.



Cashel.



Surkh Minar, Cadool.



IRISH ROUND TOWERS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXVI. No. 726.

NOVEMBER 23, 1889.

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THE Consolidation Convention of the American Institute of Architects and the Western Association of Architects met at the Burnet House in Cincinnati on Wednesday, opening with an attendance of members and other persons interested of about one hundred. The evening before the opening of the Convention was devoted to a reception by the Cincinnati Architectural Club at Pike's Hall, where the National Exhibit of Architectural Drawings was on view. This was a very successful affair, about five hundred sketches of the best American type, which is not surpassed anywhere in the world, being shown to people who rarely have an opportunity for seeing so much good work together. Prizes have been offered for the best exhibits, so we will not try to forestall the opinion of the judges, but, in general, the Chicago offices were particularly distinguished for their water-color work, while Boston perhaps took the lead in line-work, with the Detroit club very little behind. Mr. Kirby's remarkable talent was shown by a number of his best sketches. Of photographs there were few, the prizes perhaps stimulating the zeal of the perspective draughtsmen to such a degree as to crowd out the sun's uncompromising work.

ANOTHER international Congress of Architects and Engineers is to be held in 1890, in Palermo, and members of the two professions in all nations are invited to take part. At the same time an exhibition of Italian industry is to be held in the city, so that foreign visitors will find something to interest them, and they are promised a welcome from their Sicilian brethren. The Congress will continue not less than eight, or more than twelve days, and will be varied by the examination of works of interest in and about Palermo, and trips to the interior of the island. Those who would like to be enrolled as participants should send twelve francs, — two dollars and forty cents, — to the Secretary of the Congress of Engineers and Architects, Porta Felice, Piazzetta S. Spirito, 2, Palermo, Italy, before December 31, 1889, and will receive tickets entitling them to admission, and to reduced fares on the railways and steamers, besides printed copies of the papers to be read, and the journal of proceedings. Persons who can submit papers upon works of general interest to the profession are earnestly requested to do so. The papers may be either in Italian or French, and should be accompanied, so far as possible, by plans and illustrative drawings. It is particularly desirable that professional societies should, as a polite recognition of their brethren abroad, take the small trouble necessary to subscribe to the Congress, but even individual architects and engineers may find much advantage in doing so. The latter know that modern Italian engineering work is equal to any, and architects hardly need to be told that Sicily, with the neighboring mainland of Italy, which can be reached by a ferry-boat, is, architecturally and archæologically, perhaps the most interesting country in the world. In and near Palermo itself are the Palatine Chapel, and the Cathedral of Monreale, reputed to be the two most beautiful pieces of interior decoration in existence; while a couple of hours' ride away is Agrigentum, and many other places with Greek remains are not far off. If the architect is something of an archæologist, he will find plenty of Moorish and Saracen work, mixed with the Greek and Roman, while in Palermo itself the Norman kings have left a good deal of curiously modified Gothic work; and if he is a student of history, he will be interested to visit villages, of which there are said to be many remaining, both in Sicily and Lower Italy, where the inhabitants, the undoubted descendants of the colonists who came from Peloponnesus perhaps three thousand years ago, still speak the Greek that their ancestors spoke a thousand years before the wolf nursed Romulus and Remus on the bank of the Tiber; while in other villages a dialect prevails among the dark-skinned inhabitants, which is as unintelligible to the people of the neighboring towns as the singular costumes and manners of those who speak it, but which is said to contain many Arabic words, and is probably to be traced directly to the Moorish occupation and colonization of twelve hundred years ago.

A SOCIETY has recently been organized, having its headquarters in Nashville, Tennessee, which is intended to unite the architects, engineers, and other persons interested in the sciences of construction in the Southwest, for mutual pleasure and instruction, under the name of the Engineering Association of the Southwest. The Society is to have permanent rooms in Nashville, with a reading-room and scientific library, but meetings are to be held at stated periods in other cities, where papers will be read and matters of professional importance discussed. In recognition of the difficulty of getting together a large number of members of such a society to vote on the questions which are likely to come before it, the constitution provides for obtaining the votes of members at a distance, by letter ballot, on matters of interest, and, as an additional inducement for engineers and architects at a distance to join the Association, the dues for persons not living in Nashville are lower than those for residents. The experiment of uniting engineers and architects in the same society is almost a new one here, although an association of the kind exists among the German members of the two professions in New York, but it is the universal rule in Germany and Switzerland, and there is no reason why it should not succeed here. In fact, for social purposes, architects and engineers get along much better together than members of either profession separately, and German experience shows that the association is for the benefit of both.

THE deputation from the London Workingmen's Association to the Paris Exhibition has made a report, from which the *Builder* makes an extract which, it rightly says, "is of interest, if correct." According to this report, which is made by one of the deputation, upon the marble-working industry, as carried on in Paris, a system is "very largely adopted" by which many of the workmen live from six to ten miles away from the city, and have the blocks which they are to cut or carve roughed out at the shop and sent to them, to be wrought at home and sent back. This system, the report says, makes the suburban workmen "better off than the constant hands in the towns"; as they have a little land, from which, "when work is slack," they can "produce what they

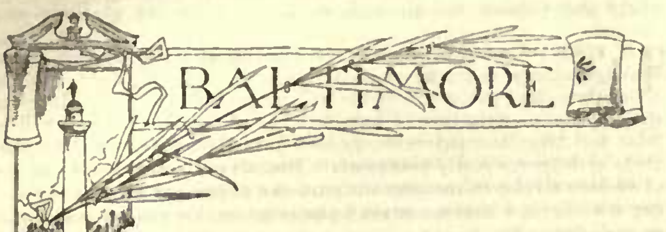
want to eat and to spare," while the masters get the work done "ten per cent cheaper." "This system," also, we are told by Mr. Mitchell, the author of the report, "prevents overcrowding in the large centres of industry," and "contributes largely to the happiness of the people, and to the absence of that squalid poverty so often witnessed in Great Britain."

THIS remarkable report presents a still greater interest in view of the tendency, which is now very marked in many sorts of manufacture, to substitute piece work at home for day labor in great establishments. So general is now the inclination of the industrial classes in Europe to this way of working that a large and increasing demand has arisen for motors of small power, which can be used in a house, or in a little shop in a yard or garden, to do work which a few years ago was always done in a huge factory, by power from a great central plant. Whether the new movement is due to the desire of the more intelligent working men and women to escape from the tyranny, both of overseers and walking delegates, and be enabled to work as many hours as they like, and utilize their time and opportunities to the best advantage, or to a moral revolution, by which men are willing to sacrifice something of their earnings for the sake of being able to work at home all day long, in the society of their wives and children, and surrounded by their flowers and fruit-trees, it would be hard to say. Probably both motives have something to do with the result, and social philosophers, as well as business men, would do well to study the movement attentively. The former will, so far as now appears, see a prospect of great moral and material advantage to the working people in promoting the tendency, or at least, in removing needless obstacles to it; while the latter, unless some unexpected change should occur, will find a rapidly increasing market for the small gas and hot-air engines, systems of distributing power by means of water, compressed-air, vacuum, fuel-gas and so on, and appliances for managing small manufacturing plants with facility and economy, which are already so popular; and, so far as our country is concerned, the development of the tendency would be greatly encouraged by the establishment of systems of suburban expresses, to deliver work and materials, which might be made profitable, at very moderate prices for the service.

THE statue of General Cass, on account of which some critical persons in Boston went through so much suffering, has been set up in the Public Garden in that city, with, as it appears, very much the result that we hoped for and predicted. So far as we can see, the critics were justified in considering the statue mean and ridiculous, but the advantage of having it set up in so conspicuous a place is that thousands of other people have examined it, and have formed a similar opinion about it, and many of the members of the military organization which paid for it are, it is said, so disgusted with it that a subscription paper is reported to be in circulation for raising funds to remove the present statue into some obscure place, and provide a better one. It is hardly necessary to point out that such a result would never have been arrived at if the complaints of the newspaper critics had been listened to, and the statue had been refused a place in the Public Garden. In that case the members of the regimental association would have continued to regard it as a beautiful work of art, unjustly shut out from public honors through the whim of a few pretended connoisseurs, and no one would have known anything more about what constitutes good sculpture than if the statue had never been made. Now, however, several thousand people have looked at it, have seen that it was unsatisfactory, and have formed some dim idea of the sort of statue which they would like better; and have received in consequence a lesson in art which will do them a great deal of good; while the more active members of the military organization, who have, from their own observation, been brought to the conclusion that their method of getting a statue of their hero has not led to a happy result, will gain a conception of the use of sculptors, as distinguished from gravestone manufacturers, which will be valuable to the sculptors, as well as to themselves, and which could not have been infused into them by an ocean of newspaper lecturing and remonstrance. General Grant, if he had never done or said anything else, would have immortalized himself by his observation that "the way to get a bad law changed was to enforce it"; and in a similar manner, the way to get bad pictures or sculpture rated at their true value is, not to talk about them, but to show them.

A QUESTION of interest to all architects is raised by a correspondent of *La Semaine des Constructeurs*, and answered, with his usual clearness and decision, by M. Collet-Corbinière. The correspondent says that he made, some time ago, plans for a villa for a certain client, who entirely approved them, as did also all the other persons who saw them. Recently, however, his client, for some reason about which he knows nothing, demanded that he should give up to him the plans, which he proposed to give to some one else to carry into execution. The architect refused, as a good many other architects that we know of have done under similar circumstances, and sent in a bill for work done, which his client refused to pay until the drawings were delivered up to him. The architect claims that he was not engaged to make plans, but to carry out the building, and wishes to know if his client has a right to dismiss him at this stage, and if he has not an artistic property in his designs, by virtue of which he can either refuse to give them up, to be carried out by other persons, or, if he surrenders them, for the sake of getting his money, can prevent them from being executed without his consent.

TO these questions M. Collet-Corbinière returns separate answers. As to whether the architect can claim that his contract was one for full services, and not for drawings only, he says that, if the architect can produce a writing, signed by his client, engaging him to plan and carry out the building in question, he can enforce this agreement, or recover damages for its non-fulfilment, but, by the French Code, the written engagement is necessary to bind his client in such matters, a verbal contract, even if attested by witnesses, being insufficient; and unless the contract for complete service is made in writing, his client may dismiss him at any point, paying him what his services to that point are worth. The question whether the architect can collect his pay, and at the same time keep his drawings, he decides at once in the negative, and he says further that the client cannot only demand and receive the drawings before he pays the architect for his services in preparing them, but that the transfer of the drawings to the client carries with it the right to have them executed, in such a way, and by such persons, as he may see fit. The law of artistic property, to which the architect appeals, will perhaps help him, M. Collet-Corbinière says, so far that only one building can be erected from his drawings without his leave. It is often claimed in court that an architect's drawings are like any other merchandise, and that the purchaser of a set has a right to use them to build from as many times as he likes, or to sell them to others, but the better opinion, he thinks, is that the transaction is not a sale, but an employment (*louage d' ouvrage*), by which the employer is not authorized to use the drawings made for him for any other building than the one for which they were originally intended; and it has been decided that where an owner built several houses from a single set of plans, the architect who made the plan could recover his fee for each of the houses built from them. We are inclined to think that in this country the law would be quite different in regard to establishing a contract for full services between an architect and his client. Not only have we no Code which removes a contract for such services from the general rule which sustains a verbal agreement, not excluded by the Statute of Frauds, which can be proved by witnesses, but we think it has been successfully maintained here that in the absence of proof to the contrary, the contract between an architect and his employer should be presumed to be one for full services, which, of course, could not be broken by either party without paying damages to the other. As to artistic property in his plans, the American law would be probably less favorable than the French to the architect. There is little doubt that American courts would decide that the architect must give up his drawings to his employer, for, although it has been held here that the drawings are instruments of service and the architect's property, the decisions are mostly the other way; but, having given them up, whether he could prevent his employer from using them for more than one building is quite uncertain. It is open to the architect to copyright his design, and, although this would hardly prevent his client from using them once, it would probably prevent other people from using them, and might be so construed that the client would be unable to use them a second time.



THE NEW POST-OFFICE BUILDING.—ITS DESIGN. — THE LAKE CLIFTON RESERVOIR. — THE FALLACY OF AMERICA'S PRETENSIONS TO HIGH RANK IN THE CIVILIZED WORLD. — A SUIT FOR COMMISSION ON UNEXECUTED WORK.

BALTIMORE'S new government building for the United States Post-office and Court-house, was formally dedicated on September 12th, although it is not yet quite ready for actual occupation. In June, 1879, Congress passed the act authorizing the selection of a site, and the one finally decided upon is bounded by Battle Monument Square, Lexington, Fayette and North Streets, the actual cost of which was about $550,000. The total additional cost of the building itself will be, when completed, about $2,000,000. It covers an area of 160 by 232 feet, being built around an interior court which measures about 50 by 100 feet, and is three stories in height, in addition to the basement and mansard roof. The outer walls are of Cape Ann granite, roughly dressed in the basement, with smooth finish for the other stories, and the style of architecture, we are told, is the "Italian Renaissance." A square tower, two hundred feet high, rises from the centre of the principal façade, and there are also eight other small square towers variously distributed around the four façades, apparently merely as ornamental features crowning a series of small pavilions, the salient points of the design, between which are colonnades of very freely treated Corinthian, as applied decoration to the walls containing the larger openings. The central tower is not without a certain degree of interest and elegance in its proportions and the distribution of its parts, and with but slight modification of details would be effective, suggesting decidedly French academic treatment. The *tout-ensemble* of the building is perhaps more suggestive of a very modern hôtel-de-ville than anything else, with a rather German inspiration as to details. These indeed are, in one sense, of the broadest character, regarded from the point-of-view of historical style, ranging from Roman classic, through various periods of so-called "Renaissance," down to the pure stone-mason's school, not omitting here and there touches of Gothic bits, all combined with a freedom that suggests no prejudice in the mind of the designer for any one of these styles. As regards an appropriate and convenient arrangement from a practical standpoint, we question the adequacy of the entrances — few in number and badly disposed — for a building whose uses must necessarily make it a continuous thoroughfare. One matter of exterior detail is unfortunate. The grade of the sidewalk falls at least ten feet in the length of the principal façade, and the area giving light to the basement along this front is coped with heavy granite curbing surmounted by a rather massive iron balustrade, following the sloping line of the grade, which cuts the strongly marked horizontal lines of the building most unhappily. The proper alternative, of course, would have been a series of horizontal "steppings."

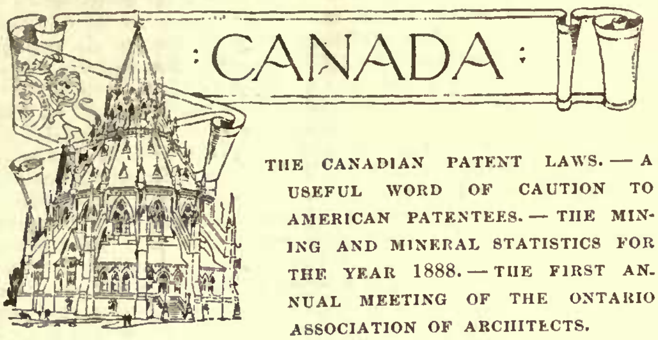
The ornamental details of the interior are massive and elaborate, a combination of marble in several colors, cast-iron, stucco and mahogany, and the criticism upon the exterior detail applies still more forcibly here. A great deal has appeared in print lately about the discovery of most defective constructive work throughout the building, involving heavy expense for repairs, with severe censure upon the late superintendent, naturally calling forth explanations and countercharges, but we are not sufficiently posted as to the facts to form any accurate judgment in the matter. One thing, however, seems to be the general opinion in regard to this building, that it is scarcely large enough for the work of the departments already about to be turned into it, and in a very few years it will be much too small for its purpose. A more carefully considered judgment, we think, would further criticise it as in many respects inappropriate in both plan and exterior for the post-office of a large city. The scheme of design that would naturally suggest itself for the façade of such a building — whose purpose is largely to accommodate a throng of people, engaged in a more or less uniform occupation, or continually moving through long public corridors — would seem to be a continuous arcade or colonnade, massive in treatment, but as open as possible for light and air, and with numerous entrances. Such a design might easily acquire all necessary character and interest, merely from its breadth, simplicity and fitness, and indeed we find this to be the case in buildings already constructed, on both large and small scale, where this scheme was apparently the leading motive in the conception. While this Post-office building has been the one prominent large structure of a public character completed during this year, and the only piece of government work done for Baltimore, the city itself has had under way one or two important enterprises of vital interest as bearing on the public welfare, and none more so than the building of the Lake Clifton Reservoir, completed within the last few months, and forming the last link in the chain of lakes which constitute what we believe is justly claimed to be an exceptionally fine city water-supply.

As far back as the summer of 1872 — a season of great drought — a serious apprehension arose as to the adequacy of the water-supply at that time, the public became alarmed, and immediate action was necessary. In rather more than a year an undertaking was completed, for the purpose of supplementing the reservoirs then existing, by a system of pumping, over a distance of more than three miles, and a height of about two hundred feet. This was known as the "Temporary Supply"; it cost over six hundred thousand dollars — of which about one-fourth has been saved in the use of old material — but was apparently an absolute necessity at the time and served its important purpose for six years, when the permanent supply first became available, having then been in course of construction for five years, since 1875. The portion of this great work, known as Lake Clifton, which has just been completed, was begun in 1879. It has a capacity of 265,000,000 gallons. The area of the water-surface is thirty, and that of the bottom of the lake twenty-two acres; there is an average depth of water of about thirty-two feet and the average elevation of the bottom of the lake is about one hundred and thirty-three feet above mean tide. The thickness of the embankments forming the lake vary from one hundred to five hundred feet, with an interior slope of one foot fall to every three horizontal feet. The total cost of this reservoir, including the gate-house and large mains, was, in round numbers, a half million dollars. There are now eight of these lakes included in the system of Baltimore's water-supply, the smallest having a capacity of 26,000,000 and the largest of 500,000,000 gallons, the total capacity of the eight being 2,274,000,000 gallons. This represents a storage capacity, if statistics are correct, capable of supplying the entire city of London for from two to three weeks, and for Baltimore, at the same rate per day, enough for four months, assuming that the smaller city is one-eighth the size of the world's great metropolis.

The unprecedented emigration to Europe during the past season from the more educated classes of the people has been shared in due proportion by Baltimore, a number of the scientific and literary men going for a fixed purpose of observation and study. At an informal re-union a few evenings ago at one of the clubs, where the subject came under discussion, there was a noticeable uniformity of opinion upon the fallacy of the prevailing idea, which our national ignorance and conceit seem to delight in expressing at every opportunity, that America, as a nation, has attained the highest degree of civilization, or, indeed, more strongly, that we, among all nations, have obtained the first place in the highest civilization. A host of facts, conspicuously evident to moderately sensitive perceptions, even when not amenable to the statistician's figures, contradicts this assumption at every turn, and leaves us but one prominent feature to claim as superlatively our own, our "immense possibilities." Many of the very innovations in science and domestic economy, which we are declaring from the house-tops that we are the originators of, we find others have been quietly enjoying for years, in one form or another, without taking much trouble to assert their claim of priority. And further, many of the details which European nations either demand or reject, as touching the refinements, or even the common decencies of life, we either do without or submit to, as the case may be, with the greatest complacency. We have not yet learned that striking results attained at certain points over a vast area, by force of science, wealth and energy, do not immediately accomplish the civilization and culture of a whole nation. Steam and electricity are to-day doing as much for Europe as they are for America, but while there they are working upon the solid foundations of the world's highest "culture" for the past two thousand years, with us there have only been as many hundreds to get a little below the surface of a very barren virgin soil. This to our great "Western" orthodoxy is doubtless rank heresy, but here in the East we are the more advanced and progressive, in that we already recognize and discuss the fact, and endeavor to act upon it.

A case of architect and client has recently been through the court in Baltimore, the testimony and decision of the jury giving some indication of the light in which professional transactions are regarded from the popular standpoint. One of the best-known architects of the city was called upon by some business men, also well-known in the community, in regard to alterations and improvements to a piece of business property. The architect's testimony was to the effect that, the owners having in no way settled in their minds what they wanted, or how much they would have to spend to get it, he was employed by them to make drawings, etc., to carry out certain plans that were discussed and settled upon, while in constant consultation with the owners, but they fixing no limit as to the cost, and the architect refusing to give any, until a regular bid should be received from a contractor, based on quarter-scale drawings and specifications. After these had been made, a radically different proposition was made by the owners for the use of the building, from that first proposed, necessitating new quarter-scale drawings, etc. Several bids were taken on these, but the owners did not proceed with the work. After some time had elapsed, the architect, finding the premises had been altered according to other designs, sent in his bill for the work he had done. At the rate of two-and-half per cent on the lowest bid received, with some slight additions for survey, measurements, etc. This the owners refused to pay, stating that they "always intended to give him something for his trouble." The

matter then went to court, the defence being that the architect had been limited as to what the building should cost, and the lowest bid being in excess of this, the architect had no right to charge for his labor, as the building had not been erected according to his designs. Two other well-known architects of the city gave testimony as to customary charges, and in regard to the schedule of the American Institute of Architects, an institution of which the lawyer for the defence asserted either genuine or assumed perfect ignorance, and designated it as some possible local "Union," unknown outside its own narrow circle. The case was given to the jury, who returned a verdict giving the architect an amount considerably less than one-half his bill, representing no special basis or rate or charges, whatever, beyond what, from their extended experience and well-informed minds in such matters, the work appeared to them to be worth.



THE CANADIAN PATENT LAWS. — A USEFUL WORD OF CAUTION TO AMERICAN PATENTEES. — THE MINING AND MINERAL STATISTICS FOR THE YEAR 1888. — THE FIRST ANNUAL MEETING OF THE ONTARIO ASSOCIATION OF ARCHITECTS.

THE Patent Law of Canada is a matter that concerns Americans to a no small degree, for statistics show that the majority of patents taken out in Canada are of American origin, or at any rate the inventions of persons living outside the Dominion of Canada, and it is a fact that the Canadian Patent Act seems to be generally misunderstood. Consequently considerable apprehension has been caused to would-be patentees in Canada, through decisions of the Commissioner of Patents, when such decisions have been unfavorable to the applicants, who have probably mistaken the spirit and policy of the Canadian Patent Acts. Our "National Policy," or the "N. P.," as it is familiarly called, is stringently and necessarily protective, to give Canadians every chance against outsiders, for the purpose of developing in Canada all manner of industries. There seems to be but one construction to be put upon the Patent Act, and that is, that the patent will only be upheld if, within a period of two years from its date, the patentee shall manufacture *in Canada* the patented article, unless he can satisfy the Commissioner of Patents, that he has been, from circumstances beyond his control, prevented from complying with this condition, and this fact must be put before the Commissioner not less than three months before the two years period would have run out.

If no demand, however, exists for the patented article, the patentee must make arrangements to meet a demand the instant it arises, and must be prepared to manufacture the article in Canada, if the demand for it arises at any time after the two years has run out. So that any one in Canada has a right to have an article patented in Canada, made for him within the bounds of the Dominion, if he requires it at any time, two years after it has been patented in Canada, or rather twenty-one months after, for the application for extension of time for the benefit of the patentee, must be made three months before the two years are over. If a demand is made for a patented article twenty-one months after the date of its patent, and the patentee being in the United States and not being able to manufacture the article in Canada, on demand, that patent lapses and is void; and not only must it be manufactured in Canada, but it must be sold at a reasonable price. A patentee, to save himself against the result of a sudden demand which he is not prepared to meet, according to the Canadian Patent Law, might succeed in getting the article made to meet the demand at great expense to himself, but he cannot put a price upon the article that would cover that expense, he must charge only a fair and reasonable price for it, and in such a case the expense he is put to only serves to save the rights of his patent. Many patentees have proceeded to put in the market their article, altogether overlooking these restrictions. Patent rights have been farmed out under stipulations that only a limited number should be sold within a certain district, or restricting the sale to some specified agent under onerous conditions. This, also, is illegal, for, as I have stated, any person in the Dominion may have the article upon demand. This does away entirely with restricted patent rights, or the possibility of demanding high prices under the assumption of a hard and fast monopoly; no restrictions can, therefore, be imposed. The aim and object of the Patent Laws is to protect and encourage Canadian industry, and the only absolute right conferred by a patent is the right to manufacture without interference. One result of this is, that there are a great many cases before the patent tribunal of Ottawa, in which the patentee is likely to suffer, and there can be no doubt that there are a great many articles in the market which are, although patented in Canada, altogether unprotected through a misunderstanding of these conditions.

A spirit of enterprise is ever on the increase among Canadians who are fully determined to manufacture all they can for themselves, and protective rights will be granted to all who desire to develop the manufacture of any article in Canada, so that it will be wise for American patentees to look into the matter and see that their articles are really protected. The advertisement sheets of the *American Architect*, teeming with articles of general use in the building trades, show that a correct knowledge on this subject is essential to the inventors.

The Geological Survey has issued its report on the mining and mineral statistics of Canada for the year 1888. The summary shows the value of the mineral productions to be sixteen and one-half million dollars, as against fifteen million dollars of 1887. The following are items of produce, the value of which exceeds half a million dollars:

Coal	$5,259,830
Iron	1,592,931
Gold	1,098,610
Bricks	1,036,746
Petroleum	755,571
Copper	667,543
Building stone	641,712

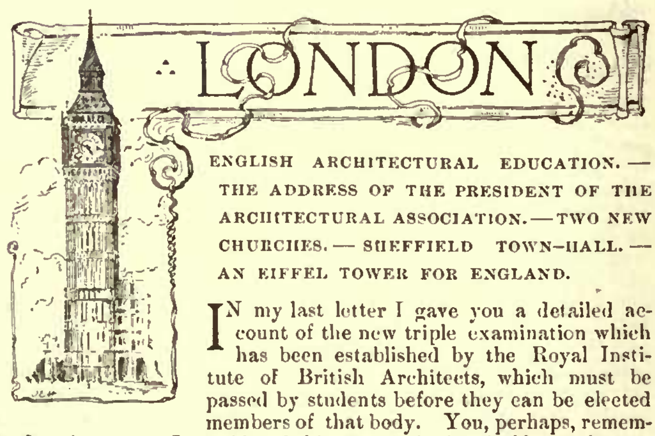
The exports of minerals for the year are valued at $4,738,810, and the imports at $28,230,788, of which $12,000,000 worth are iron and steel, and nearly $9,000,000 of coal.

From general, let us turn to domestic subjects.

According to the by-laws of the youthful society — the Ontario Association of Architects — just a year old, the first annual meeting will be held on the third Wednesday of this month, in Toronto, and the Directorate are taking steps to make its success an undoubted fact. The Association numbers some ninety members, a large proportion of whom are thoroughly in earnest, and although there are here, as in all associations, careless members, the results to be achieved by this meeting will be of the greatest importance to the profession of the province. The principal matter will be the proposed charter, the discussion of which, it is expected, will take up the greater part of the two days session. In response to the invitation of the Secretary, various papers have been promised by members on subjects of general interest to architects, but it is doubtful whether there will be time for them to be read.

An exhibition of Architectural Drawings is being arranged, which will be free to the public, and the session will wind up with a banquet given to the visiting members by the Toronto members, who naturally form a considerable majority.

The *Canadian Architect and Builder* for October, publishes an illustrated letter from the City Engineer of Quebec on the disastrous land-slide which occurred there two months ago, and which has been fully detailed in the daily press. A section of the cliff shows that there is reason for believing we have not had the last slip. The rock is fissured to a serious extent, and there is a great deal of loose soil with next to nothing to hold it up, which, if it does not come down with a run before the frosts set in, will do so directly there is a thaw. Up to this time nothing has been done towards bolstering up the cliff, but for the very good reason that no amount of bolstering would be of any use so long as the loose material remains where it is, this must either be allowed to tumble down of itself, or it must be brought down by the use of dynamite. Anyhow, precautions must be immediately taken to prevent accidents.



ENGLISH ARCHITECTURAL EDUCATION. — THE ADDRESS OF THE PRESIDENT OF THE ARCHITECTURAL ASSOCIATION. — TWO NEW CHURCHES. — SHEFFIELD TOWN-HALL. — AN EIFFEL TOWER FOR ENGLAND.

IN my last letter I gave you a detailed account of the new triple examination which has been established by the Royal Institute of British Architects, which must be passed by students before they can be elected members of that body. You, perhaps, remember how important I considered this step, as its inevitable result must be to cause a revolution in architectural education. Since I wrote you the Presidential Address of the Architectural Association has been delivered, and the line of argument followed by Mr. Leonard Stokes, the president, quite bears out my opinion. That you may fully understand the importance of this address, let me preface my summary of it by a word or two on the present condition of educational affairs here. Within the last two or three years there has grown up in the Association a small body of men who are following a somewhat similar course to that adopted by the Oriel Tractarians of

Anglican ecclesiastical history. These men are determined to place English architectural education once for all on a satisfactory footing. They seem to be animated by the terse motto of Thomas Wentworth, Earl of Strafford, and mean, I believe, eventually to go so far as to try and get rid of pupilage — that incubus of education — excellent enough in its ideal, but, in practice, often intolerable; to rear in its place a great semi-collegiate institution, wherein, they think, lies the solution of the ever-present problem of education. Of course, this intention is as yet barely expressed, much less openly advocated, for to do so in the early days of such a movement would be to raise up a storm of interested opposition that would bid fair to crush it before it had attained much strength; but, at the same time, I believe such an intention exists, and, therefore, I have told you this in order that you may be enabled to follow with more interest than, perhaps, you otherwise would have done, the campaign of which the Architectural Association president's address was the opening *reconnoissance*. Mr. Stokes began, as others have done, by stating the manifold requirements that are expected of the modern architect. I need not repeat them, for we all know what they are: know that the successful architect needs to be at once an artist, a scientist, a business man, a leader and director, often, of small armies of men. and acquainted with the habits and desires of others to an extent that, perhaps, no other profession demands. Speaking next of the defects of pupilage, and of the assistance the Association voluntarily gives to those who cannot get it when they have paid for it, he went on to refer to the effect the Institute examination was having on those sources whence architectural education was derived, and pointed to the fact that students often forsook the Association when preparing for this examination, going, as I told you last month, "to a private institution to obtain the instruction they require." Then he asked why this was, and laid it down to the door of the voluntary system, which he attacked very strongly, and gave some excellent reasons for its discontinuance and the appointment in its stead of a regular salaried staff of professors and lecturers. Of course, this meant money, and therefore Mr. Stokes turned at once to this point, and suggested various ways by which funds could be raised, among which were a closer connection with the Institute, who might then be reasonably expected to endow professional chairs, an appeal to the city companies, "who exist ostensibly for the benefit of certain trades," and, as the gods help those who help themselves, an enlargement of the present Association subscription, concluding with an appeal for help to every member of the profession to unite and forward the great cause of architectural education. The address was characterized by a good deal of earnestness, and has made a great impression, so far as I can gather, most of the professional papers and the *Institute Journal* commenting on it. Probably next month I shall be able to give you the opinion of the Institute president on the matter, as his address is also shortly to be delivered.

Two very important churches have recently been opened in this country, both costing between £40,000 and £50,000, and each to a great extent the work of a private benefactor. One is at Portsea, and is in the later Perpendicular style from the designs of Sir Arthur Blomfield, the diocesan architect, and son of the late Bishop of London. The church is 73 feet x 200 feet, and has a fine commanding tower. The other church has been erected by the Duke of Newcastle at Clumber. This building is not so large as the Portsea example. Its length is not more than 130 feet, but it is very rich in treatment, and exemplifies so far as it can the full Anglican ritual to which the Duke is so attached. It is remarkable what progress this movement is making in the Church, and although it is hardly architecture in its strict sense, yet the influence which it is having on ecclesiastical art and architecture deserves a little notice even in a professional letter. I think the best illustration I can give you is an extract or two from the report of the dedication of this church:

"Of course, the central point of interest was the altar, which, with its silver crucifix, six altar-lights, two branch candlesticks, many vases of choice flowers and white frontal, was thrown into strong relief by its rich green dossal hanging and canopy. The rood over the delicately carved chancel-screen was also a prominent object, and the lofty painted roof, the beautiful stained-glass of the traceried windows and the general proportions all attracted notice. . . . Presently the strains of the hymn, 'Light's Abode, Celestial Salem,' were heard as the long procession of choir and clergy moved from the hall to the church. First came acolytes in cottas and red cassocks, one carrying the cross, another burning incense, while others bore tapers. At due intervals two richly-embroidered banners were borne aloft. There were many clergy in the procession, most of whom wore birettas, many of them evidently for the first time. At the rear walked the Bishops of Lincoln and Southwell, both of whom were vested in handsomely-embroidered copes, and before the latter, as the bishop of the diocese, a pastoral staff was borne by his chaplain. . . . Then followed High Celebration, which was beautifully rendered. As the choir sang 'Christ is made the Sure Foundation' the altar-candles were lighted, and the celebrant, deacon and sub-deacon entered the chancel and approached the altar. The white vestments worn by them, chasuble, dalmatic and tunicle, with their stoles and maniples, were the work of Irish girls. The embroidery is worked in delicate shades of silk upon cloth of silver and mounted on ivory brocade. The colors are blended with exquisite taste, and round the medallions which form part of the design are bands of solid gold."

Another important building which is going to be erected is a Town-hall for the Borough of Sheffield. This is chiefly notable from the fact of the satisfactory nature of the competition. Architects, at first, have to send in simple sketch-plans to one-sixteenth scale, with only outline sections and one elevation. These are to be sent in without motto or distinguishing mark of any kind, even without colored borders to the strainers. From these sketch-designs six architects are to be selected for a final competition, each of whom is to receive £100. The decision is placed in the hands of Mr. Waterhouse, R. A., and all questions asked by competitors were printed on a schedule, and with answers, sent to *every* applicant. It is very pleasant to at last find a competition that is, or seems to be, above suspicion.

There has for some time been a rumor that the absurd freak of M. Eiffel is going to be repeated in England, and to-day the gossip is confirmed by an advertisement for "designs and estimates for a tower of not less than 1,200 feet in height." So I suppose nations will go on competing as to who shall build the highest tower until the limits of the power of iron is reached and a catastrophe occurs. Truly, we nineteenth-century builders are wise in our generation.

PARIS.

THE PAVILIONS OF THE AMERICAN REPUBLICS AT THE EXHIBITION.

THE American Republics have brought to bear on the Exhibition a great deal of interest and much care. All have made an effort to figure worthily in the midst of all the rich exhibits of France and the older world; they form a very important group and occupy a large part of the garden about the Eiffel Tower. These pavilions are, perhaps, a little too much crowded one on the other, to the injury of the effect of each, and the lack of relief prevents the *tout ensemble* from being properly appreciated. This inconvenience is especially noticeable in the case of Brazil, whose little building, strangled between the Eiffel Tower and the palace of the Argentine Republic, loses much of its *silhouette*, which is really cleverly studied. The greater number of these countries have laid special stress upon raw products and industrial products, which we will not speak of, their interest being entirely commercial. We will only occupy ourselves with the architectural aspects of their productions. The Republics of Hayti, Guatemala and Paraguay are the most modestly represented. Their pavilions, unfortunately, are very commonplace, quite without character, as the limited amounts of the grants made by the different countries made obligatory, but it is allowable to feel a regret, when we see, for instance, that the architect of the Dominican Republic, M. Courtois-Sutfit, restrained, doubtless, by the matter of dollars-and-cents, has not been able to give free rein to his talent and fancy. The rather mean buildings of these Republics form a border along the Avenue Suffren. The buildings are of wood, in form of châlets, and have little interest in themselves.

The pavilion of Uruguay is of much more importance, but, from an artistic point-of-view, it is not worth much more. It consists of a great hall, well-lighted and surrounded by a broad internal gallery, which forms the first-story. The entire construction is of iron, with revetment of terra-cotta, and is crowned with five domes, the middle one of which is quite large, but its general air is dry, cold and characterless.

Quite another affair is the pavilion of the Republic of San Salvador, which consists of a ground-floor and first-story, which is reached by a staircase opening from the vestibule which gives access to the bureau of the Commissioner-General. Behind this vestibule an exhibition-hall occupies the whole width of the pavilion. At the first floor the staircase opens on an atrium lighted by three pointed-arched bays ornamented with colonnades. At the back of this space is found another exhibition-hall corresponding with that on the ground-floor. The atrium is crowned by a quadrangular dome which projects above the roof, and is covered with enamelled tiles colored with the national colors, that is to say, horizonal bands of blue-and-white; but the great claim of originality in this pavilion consists in an exterior ceramic decoration formed of squares of faience disposed in pilasters or frieze, and very curiously worked out by the architect, M. Jacques Lequeux, after documents borrowed from the history of Mexico. The dominant colors are blue, yellow and dark red. In the principal façade the frieze and pilasters are composed of the symbols of the Mexican year, month and day. These decorations faithfully reproduce forms of flowers, and strange and bizarre animals, with most curious effect. These panels are continued around the four sides of the pavilion. On the rear façade is found, at the height of the first floor, a frieze containing the representation of the ancient Mexican kings, from the founder of the dynasty downwards. The countenance is the same in each case,

and the individuality is only indicated by a sign placed in the left corner. Another sign placed in front of the figure indicates speech, kings only having the right of speech in the council. Finally, on the lower story of the same façade, the pilasters borrow their decoration from the names of the ancient cities of Mexico. Two panels of faience work, representing American landscape, still further enliven this rear façade, and two other panels, the subjects of which are reproduced from ancient Mexican sculptures, decorate the side-fronts treated in the same spirit.

These façades are pierced with bays filled for their full height with grilles curved outward in such a way as to allow those inside to lean out and have a view up or down the street. These windows have a very pretty effect. This pavilion, very brilliant of aspect, which cost 50,000 francs, is an honor to the architect, M. Jacques Lequeux, and also to M. Pector, consul plenipotentiary at Paris, who, appointed commissary general, has directed all the preparations and installation of the exhibit of San Salvador.

The Republic of Guatemala shelters its exhibits under a little structure of wood of no great importance, but very carefully studied by M. Sauvestre, whose talent is always original. The decoration is entirely dependent on the effects of incrusted wood, which forms friezes and panels. The general outline is full of movement and interest. Inside, we perceive a very interesting model, in relief, of the Nicaraguan Inter-oceanic Canal, undertaken by Mr. A. G. Menocal, engineer-in-chief.

The Venezuela pavilion is one of the most successful and most elegant. It is in the style of the Spanish Renaissance, and is excessively decorated with sculpture, which gives interest to the façade without crushing it. This façade, which only reaches to the height of the first story, is composed of an entrance doorway flanked by two bays, which give light to the hall of exhibition. The head of the full-centred doorway is filled-in with arabesque work supported on carytides set in profile, surmounted by the arms of Venezuela, about which are twined *rinceaux* and volutes supported in their turn by pilasters in the form of *gaines*. Above this doorway the wall interrupts the balustrade of the flat roof. This piece of wall, well decorated with garlands and vases, has only its own thickness, and has no real structural purpose, as may be frequently seen in Spanish work. The mullioned windows forming the galleries are also crowned with arabesque work, which comes down upon *culs-de-lampe;* and in the first story of the tower, situated on the left façade, two windows with projecting balconies are treated in the same manner. This tower finishes in a very aspiring, pear-shaped dome. Inside, connected with the principal gallery of the exhibition, is found a *patio.* Two small halls and a saloon complete the arrangement. M. Paulin, the architect of this elegant pavilion, has the more right to praise, since, in order to achieve a satisfactory result, he had to struggle against an insufficient allowance, which might have rendered impossible this richness of decoration in a building which occupies an area of 450 square metres. M. Paulin did triumph over his difficulties, and the pavilion of Venezuela cost only 51,000 francs.

If the Venezuela pavilion is elegant, fine and well studied, we cannot say as much for that of Chili — all of iron, with a filling of terra-cotta. This kind of construction is very interesting in itself (and M. Picq, the architect of Chili, has given us a very successful example of it in the Library Schoelcher, which ought to be set up at Porte de France), but demands for its use new forms appropriate to the material employed. Nothing is more shocking than to see iron employed in translating Classic forms, as in pediments and Ionic columns, for example. This is the case with the Chili pavilion, whose entrance is emphasized by a doorway decorated with a pediment, at each side of which is another smaller doorway. Above is a balcony at the height of the first floor, and the whole is framed by an upright *motif* decorated with Ionic columns, all of iron. The general effect is disagreeable, and is made more perceptible by a heavy and dull decoration. The interior consists of a large hall with a gallery, which forms the first story, and is covered by a central dome flanked with four small domes in the angles. On the lateral façades, two far-projecting balconies interrupt somewhat the monotony of the design. The whole construction is in plaster on lath, with sculpture in stucco.

To finish with the least successful pavilions, I will mention that of Bolivia, in a so-called Spanish Renaissance style. This building, whose architect is M. Fouquiau, consists in chief part of a large hall, frankly expressed in the façade by a heavy dome. In the angles of this hall, lighted by two large, circular bays, a staircase and two little rectangular rooms give excuse for four square towers about 30 metres high, surmounted with enormous balls decorated with ship's prows. The entrance is by a porch composed of three covered arcades, and these by three small cupolas, which ought to be golden, but are only dirty-colored. Evidently the *parti* was not a bad one, and study might have given a very successful result. The intention was a composition made interesting with domes and cupolas, and the courses, alternately red and yellow, could have had an effect of color and gaiety. Unfortunately, this result was not achieved. The *silhouette* is heavy and ill-studied, the *ensemble* is too squatty and overloaded. A decorated annex represents the entrance to the tunnel of Pulacayo, which, as a poster states, is building by the Huanchaca Company, of Bolivia, and measures 3,276 metres in length. This side of the Bolivian exhibition is appreciated by the public.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

UNITED STATES POST-OFFICE AND COURT-HOUSE, BALTIMORE, MD. MR. JAMES G. HILL, SUPERVISING ARCHITECT.

[Gelatine Print, issued only with the Imperial Edition.]

For description see "Baltimore Letter," elsewhere in this issue.

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK CITY. MR. L. S. BUFFINGTON, ARCHITECT, MINNEAPOLIS, MINN.

[Issued only with the Imperial Edition.]

A CAREFUL study of the diagrams and profiles forwarded has led to the general arrangement indicated by the block-plan.

The plan of the structure itself is based upon the Greek cross, and in general arrangements is not unlike a Byzantine cathedral of the first order; it seeming to be more profitable to employ that arrangement, as it admits of a richness of color-decoration in mosaic, marble, etc., which is impossible in the more intricate and less sturdy forms of the Gothic.

The fact that the only type of architecture which may be called distinctively American is that mingling of Provençal forms and Byzantine details known as Modern Romanesque, and as the general arrangement of the interior seems to demand it, your designer has accordingly adopted it.

The composition of the exterior, as will be seen by reference to the perspective, is generally that of a large central dome surrounded by twelve towers of varying heights, which, it is suggested, might be dedicated to the Twelve Apostles. The roofs of all towers will be of stone. The roofs of the nave, transepts, choir, apse, ambulatories and cloisters will be covered with golden-green and bluish-green glazed Spanish tiles, laid indiscriminately without regard to colors. The roof of the dome will be covered with Spanish tiles, which will be gilded before firing and glazed with a pale-brown glaze. The body of the exterior of the building will be of limestone or marble, as may be determined after an investigation of the various quarries, and of a color as near as may be to that of buff Ohio sandstone. The trimmings will be of a reddish-brown marble. The window-jambs, mouldings, string-courses, columns, roofs of towers, etc., will be tooth-chiselled; the balance of the exterior rock-faced.

All of the interior will be cased with marbles of great variety, in which will be placed mosaics of vitrified tile or glass.

The vestibule doors will be of brass and silver, having represented upon them in relief scenes from the building of the Temple and the Lives of the Apostles.

The hemispherical vault of the nave, choir and transepts, the four main arches under the dome and the pendentives of the dome will be filled with mosaics depicting Biblical scenes.

The dome of the lantern will be of burnished gold; the ceiling of the dome itself will be perforated with many pointed, star-shaped, colored, glazed openings for the passage of light. The body of the dome will be of dull-blue mosaic, with gold and silver stars. The piers of the dome will be decorated with mosaics of the prophets.

The ceiling of the sanctuary will be an elaborate pattern in gold, silver and bronze, in which will be worked the emblems of the four evangelists in various forms. The canopy over the high-altar will be of oxidized-silver, inlaid with copper and brass, and with *cloisonné* enamel emblems, resting on four columns of porphyry or onyx with alabaster caps and bases, and all surmounted by the Archangel Gabriel in alabaster.

The vestibules will derive their decorations from the Old Testament; the crossing and central dome from the Life of Christ; the transepts from the Lives of Christ and the Apostles; the choir from the Lives of Christ and the Apostles; the sanctuary is emblematic, with the exception of the windows, which are devoted to Christ and St. John the Divine. The ambulatory about the apse derives the substance of its decorations from the Book of Revelation.

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. — MESSRS. RENWICK, ASPINWALL & RUSSELL ("*In te, Domine, Confido*"), ARCHITECTS, NEW YORK, N. Y.

[Issued only with the Imperial Edition.]

The style selected is Gothic, as the only style which has originated since the promulgation of our religion. The phase of style considered as most appropriate, because it is peculiarly English and pure, and, therefore, most suitable for an Episcopal Cathedral is the Late Decorated as exemplified in England in the naves of York and Beverley minsters, and in the choir of the Cathedral of Carlisle; this style with its charming flowing traceries is peculiarly English, and is pure, not like the last phase of Perpendicular style, which, from the

fact that the mullions are carried up perpendicularly against the arches, lost the feeling of the Gothic, and gradually begat the Tudor style. In addition to the cathedrals above-mentioned, there are very many beautiful parish churches in England, built in the Late Decorated style, and they are found in no other country.

The ground-plan is for a cruciform cathedral, with a central octagonal dome 100 feet in diameter. The dome was decided on for the following reason: In all Gothic cathedrals, except Ely, the central tower has to be supported by four great columns much larger, and projecting beyond the line of the columns supporting the clerestory. This arrangement cuts the perspective and narrows the building in the part where there should be certainly a width equal to that of the central aisles of the nave and choir, and thus obstructs the sight of the worshippers. In a cathedral 500 feet long this would be more felt than in one like York, which is 525 feet in length. The dome obviates this entirely, and, at the same time, affords an unobstructed space in the central part of the building near the sanctuary and pulpit, capable of seating 1,500, and with the nave and transepts, 3,000 to 4,000. In the Cathedral at Ely, the central dome has always been considered by all writers on architecture as the crowning triumph of Gothic architecture. Here, the dome springs from the same line as the arches of the nave and choir, and, if criticism may be allowed, it is perhaps a little low; on the other hand, those of St. Paul's, London, and St. Peter's, Rome, raised on high drums are too high, and dwarf the proportions of the central aisles. In the plan submitted, as the dome is 100 feet in diameter, while Ely is only 67 feet 6 inches in diameter, the spring of the dome has been raised to the height of the top of the anchors of the nave, and this will add both to the apparent size of the dome and make it an integral part of the cathedral. The exterior dome is raised above it sufficiently to make it, as it should be, the great central feature of the design, and is panelled on the outside, which will be a new feature in Gothic architecture, and by those who have seen the Arabian domes of Cairo, it will be understood how beautiful an effect this produces.

In the old cathedrals the side-aisles are of little use, and are, therefore, too wide. In the plan submitted, they are 15 feet wide, and the central nave is 50 feet in width. The side-aisles cannot be used for worshippers as the columns obstruct the view of the sanctuary, and they are made as narrow as proper proportion will allow; a width of 50 feet has been chosen as the best for the central nave, as it is known from observation in the cathedrals of Southern France, Bordeaux and Marseilles, that the immense size of the buttresses necessary to support the arches of a nave of greater width is a blemish, and destroys the unity of the design.

In the English cathedrals, except Norwich, Gloucester and Peterboro, the eastern termination is square and filled with one great window; this, however effective in buildings more than 500 feet long and with central aisles from 35 to 45 feet wide, would not be so in a building 400 feet long and with a central aisle of 50 feet; it would shorten the length of the building and dazzle the eyes of the worshippers. Therefore, the apsidal termination has been adopted, which will add to the perspective or length of the cathedral. The apsidal chapels of the great cathedrals of France, Germany and Italy, are one of their greatest beauties from the combination of light and shade made by the various buttresses and the facets or sides of the chapels. These have been added to the plans submitted, not as chapels, but as robing-rooms for the bishop, clergy and choir.

The material to be either granite or white marble, with brick for the backing and the interior to be lined with Caen stone.

It will be noticed that the two side-doors of the front in the towers are of different designs. This was done for the purpose of giving a choice to the Trustees, the intention being to have them both alike if the building is constructed.

COMPETITIVE DESIGN FOR THE CATHEDRAL CHURCH OF ST. JOHN THE DIVINE, NEW YORK, N. Y. — MESSRS. PARFITT BROS., ARCHITECTS, BROOKLYN, N. Y.

THE authors have sought to present a study from the Gothic architecture of the thirteenth and fourteenth centuries.

The height of the central tower is about 520 feet, while the front towers are a little higher than the recently completed spires of St. Patrick's Cathedral.

The plan conforms in all respects with the requirements of modern worship, yet having a breadth of treatment in the nave surpassing any other Gothic structure. In the north, east and west the windows are as numerous as possible, while from the south will be one huge rose window 60 feet in diameter, suggesting a rich jewelled treatment. The aim in the study of the entrances was to make them as rich and dignified as possible. The eastern porch is an adaptation of Chartres, while the motif of the main front is an adaptation from the numerous examples in the north of France, particularly Amiens. The arrangement of the vestries, choir-rooms and offices has been given special attention that the entry for the clergy and choir for services be dignified and convenient. Suggestions have been made for an assembly-hall and convention-house in the line of a treatment for a cathedral close with schools, residences and gateways. Special study has been given to prevent the interior discoloration and seeming decay from climatic influences, and for this purpose and also for heating, ventilating and carrying off roof-water, double walls, with concealed passages between, have been provided. The double walls necessitate double windows, the outer to be designed with heavy mullions and glazed with good ordinary lead-work, while the interior windows protected from harm may be designed with lighter mullions, and thus permit of a larger and broader treatment in colored-glass. For the interior, while relying on the grandeur of constructional lines, would be suggested a treatment of mosaics, and opportunities for memorials and monuments.

CHICAGO

ALTERATION OF OLD BUILDINGS FOR OFFICE PURPOSES. — THE OLD CHAMBER OF COMMERCE A REMARKABLE INSTANCE. — THE REAL ESTATE BOARD BUILDING. — THE EVENING JOURNAL BUILDING. — THE WORLD'S FAIR MOVEMENT.

AT one time during the past year it looked as if the number of very large and heavy buildings was about to exceed the demand, but such does not seem to have been the opinion of investors, for not only is the amount of work of this character now as large as ever, but the extraordinary number of "repair jobs," if one may speak so disrespectfully, has been a feature of this year's work. So much have the modern buildings with their well-lighted corridors and offices, their rapid elevators and all modern improvements crowded out of the market the older class of structures that these owners have, at length, awakened, and the number of very extensive repairs and alterations in the business part of the city has been a constant subject of remark. Many of these dark and inconvenient "old vaults" have been converted at no small expense, however, into desirable office-buildings. As such work is ordinarily considered the most disagreeable and unsatisfactory that falls to an architect, it is interesting to note one or two of the solutions that have been given to these uninviting problems.

One of the very largest of the heavy office-buildings now under way, is a curious combination of both old and new work. This structure, which is now thirteen stories high, was the Chamber of Commerce Building, occupied until about six years ago by the Board of Trade, and its height was only about five stories of the present building. In order to erect the present construction (which is over 180 feet to the cornice) the advisability of entirely taking down the old structure was considered, and, after taking proposals in both ways, it was decided to allow it to remain. Accordingly, the building which is some 90 x 180 feet, was placed upon jack-screws and held in position, while the old foundations were taken out and replaced by entirely new ones. All the interior, as well as the roof of the old building, was then removed, and the interior space was laid out anew, both as to heights and general division of floor-space; the outer walls, of course, being all the time properly braced. Iron columns were placed where required: those on the outer walls being placed back of the piers of original building, and upon these the greater part of the superimposed weight is carried. The old stone piers have been cut down in width and new windows put in, so differently arranged that, as one looks at the structure, the only familiar thing is the entrance porch with its stone columns. The entire new portion of the building is a terra-cotta covering of the iron frame-work inside. Both the color and appearance of this terra-cotta is so similar to the stone that it is ordinarily taken for such, and certainly the effect is very harmonious. The idea of small piers and large openings has been carried out, following the general principles now so universally accepted here. At length the roof is on, and the general effect of the exterior is now obtainable: while of an extreme simplicity, with scarcely an ornament up to the cornice, it gives indication of making one of our most satisfactory large buildings. The structure has light upon the four sides, and in addition has in the centre an enormous light-court covered with a sky-light, the effect and result of which is, however, not yet very evident.

Contractors have now been at the building for considerably over a year, and as far as superficial signs would show, all the work seems to have been done upon a principle very rarely accepted here of doing the work well and getting it finished as soon as consistent with such requirements, rather than upon the more generally practised idea of doing the work as quickly as possible, without too minute inquiry into how it is done, or how it is to appear ten years hence. The structure is, of course, absolutely fireproof, and will probably cost very close upon a million of dollars, and when entirely completed will be, by far, the most remarkable work of alteration ever done in the city.

Another building that has been completely overhauled is the one now known as the Real Estate Board Building, corner of Dearborn and Randolph Streets. Although the character of the work is by no means to be compared with the Chamber of Commerce Building above described, still it is an example of some six or eight similar

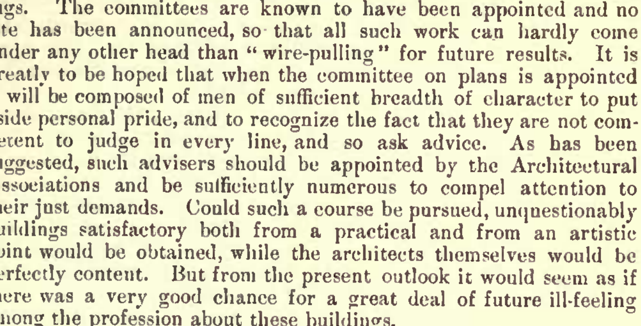
improvements that have been made, and is, in fact, more like the common every-day kind of alterations that are not particularly interesting or satisfactory. This building was first carried up two stories higher, with as light construction as possible, this being entirely covered with galvanized-iron. A large central light-shaft, or well, was then cut from roof to main floor, and in this are the stairs, elevators and the balconies or corridors, from which all the offices open. By making all the floors of these balconies, as well as the stairs, of glass and iron, an effective and satisfactury solution has been reached. This idea of a large well, with everything in it of glass and iron, has been largely adopted in several remodelled blocks as the most satisfactory method of treating old and dark buildings, and, as a general thing, is decidedly successful.

The building occupied by the *Evening Journal* has been considerably remodelled, especially the first story and the front, and in the course of the work a rather unusual problem was very cleverly solved. Originally this front was carried upon four points of support, but for the purpose of obtaining more light it was thought desirable to replace the two central ones, which were heavy stone piers, with a single iron column. The holding of the building up and the taking out of these piers was simple enough, but the difficulty was to prepare a foundation upon our compressible soil, which should not do as all our other foundations do — settle. This difficulty was, however, got over in the simplest manner by utilizing the foundations of the two old piers. At the level of the basement-floor heavy steel beams were run from one to the other, and the columns from above rested upon the centre of these beams, which were strongly bolted together; practically, the same weight as originally was thus carried again upon these two foundations, which had already settled with the rest of the building, and consequently no further movement was to be expected.

The World's Fair agitation is moving merrily along, and not the least doubt is here entertained of Chicago being the chosen city. Architects are so sure of this that, according to the common report, two offices are already working upon sketches, while four different parties are said to have made arrangements with the best architectural water-colorist in the city to do work for them upon their drawings. The committees are known to have been appointed and no site has been announced, so that all such work can hardly come under any other head than "wire-pulling" for future results. It is greatly to be hoped that when the committee on plans is appointed it will be composed of men of sufficient breadth of character to put aside personal pride, and to recognize the fact that they are not competent to judge in every line, and so ask advice. As has been suggested, such advisers should be appointed by the Architectural Associations and be sufficiently numerous to compel attention to their just demands. Could such a course be pursued, unquestionably buildings satisfactory both from a practical and from an artistic point would be obtained, while the architects themselves would be perfectly content. But from the present outlook it would seem as if there was a very good chance for a great deal of future ill-feeling among the profession about these buildings.

Some architects are already advising against a public competition, while others claim that many parties outside of Chicago will consider that, for such a national affair, they have equal rights with those living here. Also, the local architects who have subscribed to the fund will consider that they should, at least, have an invitation and a fair chance to show what they can do should they so wish, even if they have done no wire-pulling and have no personal friends upon the committee.

Were it possible, as in some of the older countries, to have a series of competitions properly conducted, that would unquestionably bring the best talent to the front both as to plans for the grounds and as to plans for the buildings, but with the competitions conducted as they ordinarily have been in the United States up to the present time, it would certainly be better to avoid them altogether.



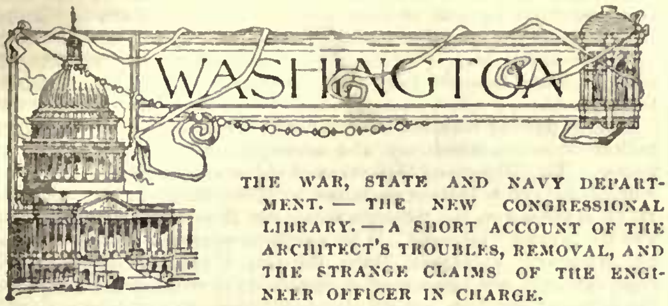
THE POTTERY EXHIBITION OF THE PENNSYLVANIA MUSEUM AND SCHOOL OF INDUSTRIAL ART.—TERRA-COTTA AND STAINED-GLASS.

THE Pottery Exhibition held at Memorial Hall under the auspices of the Pennsylvania Museum and School of Industrial Art, while it has shown nothing particularly new in designs for pottery, has given proof of an enormous advance in both the design and manufacture of American stained-glass. The judges in this section are Messrs. T. P. Chandler, Jr., W. P. P. Longfellow, Frederick Crowninshield, Charles C. Haight and Charles M. Burns. Their report begins by deprecating the fact that so few designers and manufacturers are represented in a competitive exhibition where such liberal prizes are offered. In Class I, — figure-designs for ecclesiastical purposes, — the first prize goes to Mr. Francis Lathrop for his two figures of David and Jonathan, the second prize to the Tiffany Glass Company for its elaborate memorial window, a piece of splendid color, and the third to one of Mr. Maitland Armstrong's windows. In Class II, — figure or ornamental windows for domestic purposes, — Mr. Edwin Ford takes a gold medal for a billiard-room skylight, a wonderfully pleasing design in very pale tints, Mr. Armstrong a silver medal, and the Tiffany Glass Company a bronze medal. Mr. Alfred Godwin shows a square panel of an entirely new kind. The pattern is a Persian one — a simple, central feature surrounded by a very elaborate and delicate border. The material (except in some places, as the background of the central feature) is clear glass with a glaze of porcelain, very thin, on one face. The effect of this panel is most pleasing, and Mr. Godwin's invention has one strong point in its favor: it shows well with the light on the same side as the spectator, so that a window of this material will bear looking at from the inside of a room lighted in the evening, instead of having that most unfortunate repulsive appearance that opal and opalescent glass so often has under like conditions. The fascinating beauty that changing lights may give to glass of these later kinds is shown in one of the Tiffany Glass Company's windows, called "Victory." The window, as a whole, is not exactly a success; it tries too hard to be a picture. It is too broken and restless in design, and yet it contains superb bits of color — for instance, the gorgeous red of the flag on the left. The execution of this window shows some immensely ingenious devices in the way of leading, etc., but one of the most striking features is the use of the opalescent glass just spoken of. It is of this material that the robes of the three women in the foreground are made. The white of one is of a cool grayish tint. The others are also white, but tinged delicately, one with green and the other with salmon. The sweep of the garments is indicated with very little leading by choosing from a great many square yards of glass those pieces whose ridges and folds — one might almost say whose modelling — conforms most nearly to corresponding parts of the cartoon. This necessarily imperfect way of representing drapery is certainly not to be commended, but it is impossible not to admire some of the effects, although they may be much more the result of chance than of design.

A special prize of $200 was offered for the best cartoon for stained-glass. This was won by Mr. Lathrop. As for the public, which did not care whether the drawing was made so that the glass-worker could use it without alteration, or whether it was the work of a painter who did not take into account the exigencies of the material of which his finished design was to be made, it divided its admiration between a large cartoon of Mr. Will H. Low's and two admirably drawn figures — a crusader in armor and the little figure of a boy in mediæval dress — by Mr. Millet. The jury's report on this, the first representative exhibition of American stained-glass, is so thoughtful and so interesting that I may be pardoned for quoting from it at some length. It says: "On the whole, the exhibit has the merit of being distinctively American. It shows the novelty of material and method, the excellence of color and tone, the faults of design, that distinguish American work." And again: "To sum up: the judges have to notice as recognized qualities of American glass-work, fairly illustrated in the present exhibition, a strong feeling for color and the development in the best examples of great richness and brilliancy, or in another direction of great delicacy and refinement in the harmony of color. The invention and development of a new and legitimate style, which results from the employment of a new and characteristic material in opalescent and translucent glass, with or instead of the transparent glass, which has hitherto been used alone. And as accompanying tendencies which had to be restrained and guarded: A tendency to rely on mere splendor or beauty of material and upon tricks and *tours de force*, to the neglect of the higher qualities of design, of good ornamental form and of good drawing; a tendency among designers to use pictorial rather than decorative effects, to try to put into glass what properly belongs to mural painting, and even to easel painting, the result of unfamiliarity with their material and of the habit of conceiving their designs in pigment instead of transparent substances."

In the exhibition of terra-cotta only two firms are represented: the New York Architectural Terra-cotta Company, which takes the first prize for a general exhibit, and Messrs. Stephens, Leach & Conkling, of this city. The jury, Messrs. Russell Sturgis, John V. Sears and W. P. P. Longfellow, say, with much truth, that there is nothing in the exhibit "which differs in any respect from the work furnished daily to buildings in course of erection." In tile-work, the Low Art Tile Company has taken the first prize in every class in which it exhibits. The display of the Providential Tile Works includes some friezes of glazed tiles in high relief, suitable for outside decoration.

A very useful feature of this exhibition is the loan collection, containing, among other things that parallel the modern work shown, thirty or forty examples of old painted glass from churches and private houses of Germany and Switzerland. Next year, it is proposed to hold an exhibition of iron-work made in this country. A loan collection of old work of this sort would probably be of more use in connection with such an exhibition than even that of this year, for the amateurs of old iron-work are many, and a great deal of excellent locksmith and light iron-work of the Gothic and Renaissance periods can, no doubt, be collected for the purposes of comparative exhibition.



THE WAR, STATE AND NAVY DEPARTMENT. — THE NEW CONGRESSIONAL LIBRARY. — A SHORT ACCOUNT OF THE ARCHITECT'S TROUBLES, REMOVAL, AND THE STRANGE CLAIMS OF THE ENGINEER OFFICER IN CHARGE.

THE new State, War and Navy Department Building was authorized March 3, 1871, and designed in the Supervising Architect's Office, when Mr. A. B. Mullet held that position. For a short time it was under Mr. Potter's charge. On March 3, 1875, it was turned over to the Engineer Department, United States Army, being under the supervision of General Babcock for a period of two years, when General Casey took charge and held possession until the building was completed. The building is not effectively designed, being a mass, without grouping, of small details. Each small window and post, and there are hundreds of them, are treated separately. The proper dignity and repose necessary for a large Government Building is lacking. Except among the profession and a few civilians General Casey is supposed to have been architect and superintendent.

Congressmen have recently mentioned this building as an example of the superior ability shown by the Engineering Department in supervising Government buildings. See, they say, the south wing, costing some $3,373,000, under the supervision of an architect, and the north wing, both identical, costing $1,914,000, under the superintendence of army engineers.

There were several good reasons for this great difference; it would never have occurred in a private architect's practice, or if the building had been in charge of a private architect. The fifteen per cent contracts, of which architects have heard so much, were modified just before the north wing was commenced. This one fact caused a difference of $900,000 in the labor on stonework. Wages were much higher in the first instance than in the latter. I have before me a comparative list of wages in 1876 and 1880:

	1876.	1880.
Bricklayer	$4.00	$2.00
Granite-setter	4.50	2 25
Carpenter	3.00	2.00
Hod-carriers	2.00	1.50

It can be seen that the principal labor on this work was double in 1876 to that in 1880. But this, of course, is not all; the patterns for stone, plaster, stucco, etc., necessary in the first instance, but not in the last, would be no inconsiderable item. Then machinery and other things which it was not necessary to buy twice, and which cost about $130,000. The transfer of a building from one department of the Government to another is not of as much interest or of as much importance to architects in a private practice, as is the discharge of a private architect, and filling his place with an army engineer.

This occurred in the Congressional Library. Mr. J. L. Smithmeyer won the Library in a competition about 1873. From that time to 1886 any and all had an opportunity to tilt at it, and it was necessary for him to hold it good against all comers. A second competition found him still victorious. During the thirteen years, any scheme submitted was considered by the Congressional Committees which have had the matter in hand. From time to time Mr. Smithmeyer made numerous variations of plan and many different designs for the Congressional Committees, and an extended trip to Europe to study the subject.

His original plan, with few modifications, was finally adopted, and he was appointed architect of the building, and took charge October 1, 1886. Few can comprehend what an architect has to contend with who has his country for his client, when Congress is acting as the agent. In the first place, the whole thing was put in charge of a Commission consisting of the Secretary of the Interior, Lamar; Mr. Spofford, Librarian; Mr. Clark, Architect of the Capitol. To this Commission was submitted all questions as to the use of material and the construction of the building, as well as the financial matters. The material, whether it should be brick, granite or marble, was not determined by Congress, but this Commission apparently had full power to dictate to, or hamper the architect in questions of design, construction and finance.

Everything went along with comparative smoothness until the materials were furnished for the concrete to be used in the foundation. Mr. Smithmeyer had drawn his specifications calling for cement with a tensile strength of 300 pounds to the square inch. Samples were sent with the bids which, when tested, came up to the quality specified.

The lowest bid was accepted. The first thing the contractor did was to send a different brand of cement from the sample which had been accepted. By order of the Commission this brand was tested and found wanting, then a second batch was forwarded, which had been found up to specifications when tested in sample, but was deficient when tested in fact. Another brand was forwarded, under similar circumstances, with similar results. The samples of cement were found to set very quickly, and were rejected by the architect as well on this score, as their lack of tensile strength. Mr. Smithmeyer had numerous tests made at the Washington, New York and Philadelphia public laboratories, the Massachusetts Institute of Technology, the Watertown Testing-station and the Washington Navy Yard.

The tests all show the quality below what the specifications called, not only in their minimum tests, but in their average strength. All make a special note as to the quickness with which they set, a large number of the samples setting in less than five minutes, some even in a half minute.

General Meigs is the only judge who claims that the cements are up to their proper strength, and he uses the rather extraordinary argument that the cement is as strong as the highest test shows it to be. He says: "I can report that 'Black Cross' cement has a tensile strength of 459 pounds to the square inch, much more than the specifications require. The 'K. B. S.' cement has a strength, as shown in the test-block No. 1, of 307 pounds per square inch. They are, in my judgment, excellent cements, quite good enough for the Library of Congress." These are the maximum breaking strains of the two varieties. His other tests show seven below 300 and two as low as 172 and 181. The General then proceeds to make quite a little argument as to the reason why the highest, and not the lowest, or even the average strength shown, should be taken as the true strength. He assumes that the officials at all the places in the country where they are in the habit of doing such testing daily were not expert in mixing, moulding and pulling, and if by chance (due probably to some peculiar method of mixing which could not be repeated for use in the building) one was highest, it showed the real strength of the cement.

He seems to forget the careless handling in making concrete, dirt and improper proportions, poor sand, and other faults which are more liable to creep in in practical work than in making briquettes. The poorest briquettes could well represent the poorest concrete.

After much importunity of contractors and their friends, the Commission determined to refer the matter to the army engineers, accepting any of the cements that they should choose to pass. The conscientious, painstaking architect was rebuffed by the appointment of one of General Casey's assistants at the War, State and Navy Department, to superintend the construction, Mr. Smithmeyer being still employed to furnish the plans. Cement, etc., was accepted from this time rapidly. Whether a higher grade was furnished or the standard of the specifications lowered I do not know. From this time it was apparently settled that Mr. Smithmeyer should be replaced by the Engineer Department. In a few months an attack was made on the architect in reference to the excessive cost, Congressmen claiming that it was understood the building was to cost only $3,000,000. How any estimate could have been made when it was undecided whether brick or stone should be used it would be hard to tell. But at this date the cry was: "It will cost from $6,000,000 to $10,000,-000, according to finish." This was sufficient. The architect was discharged, and on October 2, 1888, the whole matter was put into the hands of the Chief Engineer, United States Army, and the architect found it necessary to sue for payment on his designs.

What had been done in similar cases, where the cry of extra cost was not assumed, but was true?

Was General Meigs replaced when the Pension Building cost three times the estimate? Was Major Lydecker discharged from the army when the tunnel more than doubled the estimate, and was, besides, a total failure? The first was retained for years while finishing the building, and at the same time was drawing his salary as a retired army officer. The other still retains his rank in the Engineer Corps, United States Army. The architect of the library, having given practically fifteen of his best years to the study and perfection of this problem, was ordered out without ceremony, and the engineer officer, who had never had the slightest sympathy or connection with it up to this time, and had never given it more than a casual thought, was put in charge.

The Commission was abolished. The engineer officer had, you might say, unlimited power conferred upon him by Congress. He had the power to alter plans, make new plans, change construction and business management; in fact, do anything he saw fit, provided he made the building cost within $4,000,000. There is no doubt but the architect who had studied the subject fifteen years could have modified the plans to come within the sum to greater advantage artistically as well as economically than the engineer, who had presumably never before given the subject a thought.

The point of interest now was: what changes would the engineer officer make in the plans and management?

He submitted two schemes to Congress. One was simply cutting a slice out between the centre and end pavilions of J. L. Smithmeyer's plan and pushing them nearer together, making the building 318′ x 333′, instead of 332′ 9″ x 463′ 11½″, as shown on the original plan. This set was, according to title in big black letters on each sheet, prepared under direction of Gen. Thom. Lincoln Casey, Chief of Engineers, United States Army.

After a careful comparison of this set with J. L. Smithmeyer's, I find only these differences: The front and rear made shorter by bringing the end pavilions nearer the centre; two small tower-roofs omitted on the corners of central pavilion; the necessary omissions

in plan to allow for the shorter front. Side elevations and sections east and west are identical; in fact, lithographed evidently from the same drawings. Still they are all prepared, according to the large, black type, "Under the direction of Gen. Thom. Lincoln Casey, Chief Engineer, United States Army." It might have been supposed that this was put on by some officious subaltern, but, in another place, on every sheet we find the following in the handwriting of the General himself:

Thos. Lincoln Casey,
Chief Engineer, U. S. A.,
In Charge.

Mr. Smithmeyer's name does not appear. Any one looking at these drawings, any one looking over these reports, would think that the General originated the scheme, or, at the least, had made some valued modifications of the Smithmeyer plan. Mr. Pelz, who has been employed by General Casey, and who has about the position of a head draughtsman, has modestly signed his name in one corner as architect. Now comes the strangest feature of this report. In the first case, General Casey's name had little, if any, right on the modified set. There can be no question that, in fairness, Smithmeyer's name as architect should have been placed on the original set. In the whole nine sheets it is omitted, or more probably erased, except where he had written it in among the shrubbery of the foreground of his perspective. Of course, any one looking at this report would immediately think that these designs and plans were also prepared under the directions of the Chief Engineer, United States Army. The architect's plan, to cost $6,000,000, was finally adopted by Congress.

But I have written enough. The profession, good architecture, and the people, who need education, and the Government, which needs artistic buildings, have more to fear from the encroachments of the Engineer Corps, United States Army, than they have from the improper organization of the supervising architect's office. And the American Institute of Architects would do well to bring its influence to bear, and try to stop such assignments of work.

NEW·YORK

THE PLAN OF NEW YORK. — THE MARQUAND AND WILLARD COLLECTIONS.

IF it could be determined just why New Yorkers are always in a hurry, and why they spend their days in a breathless chase, trying to snatch the time which seems always to have just escaped them, perhaps a remedy could be found and applied, which would in time make New York a most attractive place in which to live and work and learn.

We have many of the necessary elements for the attainment of the highest forms of enjoyment, but we have also many more obstacles between us and our enjoyment than other large cities have.

As far as my own experience goes the feeling of haste and the constantly obtruding consciousness of what one has not accomplished, is peculiar to New York rather than to its inhabitants. Away from his native city the New Yorker can find time enough to accomplish and to enjoy as much as any one whether of London, or of Paris, of Boston, or of Philadelphia.

One of the important factors in our unrest is our city, not its size, nor its shape, but the utter stupidity of its plan and the unfortunate distribution of its several functions, to apply that term to its places of residence, business, amusement and instruction.

An interesting competition could be made, by giving, as a basis, the map of Manhattan Island and the country within ten miles and calling for plans of a city of two millions of inhabitants with five hundred thousand in the suburbs. Confine the plans to the indications of the positions of the essential buildings for the government, commerce, education, amusement, supply and residence, etc., of the inhabitants. Lay out the main lines of railroad and water transportation, the water-supply and the main streets and avenues. The prize to be awarded to the plan which would, without sacrificing the park and breathing spaces, bring the average resident nearest to his government, his business and his amusements. I am sure that New York would resemble the successful plan in no one particular, but our future Haussmann might benefit by the comparison.

The fact that I received cards to three most interesting exhibitions, all for the same afternoon, and none of which I wished to miss, brought home to me with more than usual force, the terrible handicap imposed on us by the short-sightedness, indifference and greed of our ancestors, who gridironed our city, and of our contemporaries who are unwilling or unable to initiate any far-sighted policy for remedying this blunder and benefiting by our natural advantages.

To go from my office to the Metropolitan Museum, to the Union League Club, to the American Art Galleries and then home, in a central location, meant about eleven miles and a half of travel, two hours of time and twenty cents. As nearly as I can approximate the same could be done in Boston or Philadelphia, Paris or London with one-half the time and money, or less.

Not to dwell longer on the darker side of the undertaking, the things I was able to see fully repaid me for all the trouble of getting to see them.

I made passing mention last winter of the new gifts to the Metropolitan Museum, which are now arranged and thrown open to the public. The Marquand Collection of old masters, and pictures of the English School, is further enriched by three Rembrandts loaned by H. O. Havemeyer, the "Burgomaster van Beeresteyn" and his wife and the famous "Gilder." With excellent portraits in the collection by Masaccio, Velasquez, Hals, Rubens, Vandyck, Reynolds and Gainsborough, one has a most exceptional opportunity for comparing the different manners, but it is impossible here to say more than that the collection is of the very best, and so much more choice than the old masters in the other gallery (amongst the first acquisitions of the museum) that no comparison is possible.

Rembrandt's "Gilder" I must refer to again as it seems to me the best painting we possess on this side of the Atlantic, of finer quality if not more powerfully painted than the "Portrait of a Man," now at the Union League, and recently purchased by Mr. Ellsworth, of Chicago, from the Princess de Sagan. The collection of musical instruments given by Mrs. J. Crosby Brown is also open to the public now, but it is useless to try to give an idea even of the wealth of decorative motive it contains.

A small collection of wrought-iron work given by Mr. Marquand is also new. It occupies an alcove to the left as one enters the Museum, and is closed by a pair of exquisitely wrought gates, rococo in their design, but so true in the treatment of the material and so skilful in workmanship as to disarm the most rigid purist. There are about three hundred and fifty numbers in the collection and about double that number of pieces, mostly locks, hinge-plates, handles and keys of German or Swiss origin, I should judge, but there is as yet no catalogue, and the styles and periods of wrought-iron work are less distinctive than in most of the handicrafts. The collection compares favorably in quality if not in variety with those in Nuremberg and in Bâle.

The new collection of the greatest and most direct interest to the architect, however, is the Willard collection of architectural casts, the first instalment of which is now in place in the central hall of the museum.

It is impossible to know, as yet, the full scope of the collection, the portion now in place being only a half, or according to some a third of the whole, but one thing is evident at a glance; that the subjects have been admirably well chosen, not only for intrinsic value, but for their place in the historic development of sculptural art. No attempt has yet been made to catalogue or to put descriptive cards on the individual pieces, but the arrangement is chronological. Many of the casts are from subjects that have never been moulded before, and all are excellent in delicacy and faithfulness to the original.

As one enters the central hall, there are on the walls to the right a series of the large low-relief sculptures of Babylonian and Assyrian origin, then a few Egyptian casts. One comes next to a reproduction, at full-size of the Pandrosion, occupying the place of honor against the centre of the end wall, the simple base, the four lovely caryatides and the cornice, all exactly reproducing the present condition of the monument. The farther corner contains Roman and Greek work, several large capitals, exquisite altars and candelabra, a section of a very rich Roman order, and numerous panels and friezes, some of them well-known, others entirely new to me. Then comes the Romanesque, very well chosen and effectively arranged, one doorway in particular, one of the few pieces which is colored to suggest the stone. This leads me to say that I cannot but feel that it would be a great advantage to have all the casts colored. In carving stone or marble or wood, in a decorative spirit, the color and texture must play such an important part that one cannot too strenuously insist on their importance. To reproduce the marble, stone or wood in white plaster, whose strong reflected lights eat into all the hollows and tend to obliterate the surface treatment, is to run the risk of losing sight of the reasons which led to the use of a particular form of ornament or method of tooling, whilst in the original color and texture those reasons would remain obvious. This imitative coloring of plaster has been most successfully done in France, and could, no doubt, be done here, one needs only to bear in mind that the object to be attained is rather an unobtrusive suggestiveness, than a slavish and labored imitation. There are, right at hand in the Museum, antiques sufficiently varied to serve as models. To return to our survey of the collection, after the Romanesque and Byzantine comes the Gothic work, then turning another corner we come, on the end wall opposite the Pandrosion, to a charming choir-stall in the Transitional style that immediately preceded the Renaissance, then a copy of the carved wooden doors of the Church of St. Maclou, at Rouen, attributed to Jean Goujon. We are now around to the left of the entrance, which is devoted to the earlier Renaissance, with excellent examples of both Italian and French work.

In the centre of the hall stands the pulpit from the Baptistry, in Pisa, by Nicolo Pisano, and in the different parts of the hall, a little to one side, but still in relation to their respective chronological affiliations, stand a number of very interesting pieces; a section of the cloister arcade of St. John Lateran, at Rome, with mosaics

of the twisted columns and of the frieze, picked out in colors, the front of a German half-timbered house, about one-eighth of full-size, also in color to distinguish the different materials and reproduce the paintings, figures and heraldry. There is, also, a lovely Italian Renaissance front on a triangular base, and a figure of David, by Donatello; and running along the rail-way of the balcony, is the Parthenon frieze, though, whether this is full-size or not, was not easy to determine; in its surroundings it looks smaller.

The effect of the whole is extremely interesting and pleasing, and, aside from its interest and value professionally, it will, when completed, and with each piece properly ticketed, prove, surely, one of the most powerful educational forces of the Museum.

The committee, charged with the carrying into effect of the provisions of the Willard Trust, deserve the warmest thanks of the public, the profession and the Museum, for the zeal, knowledge and taste they have brought to the task.

The Union League Club continues the plan inaugurated last winter of having, besides the pictures shown at their monthly exhibitions, a loan collection of some particular kind of porcelain, or kindred handicraft. Last winter's exhibitions were of blue-and-white, of *sang de bœuf*, of jade, etc., and this season begins with a wonderful collection of *cloisonné* enamels, besides some rare porcelains and enamels. The paintings supplement the collections at the Museum with Teniers' "Five Senses" and the Rembrandt "Portrait of a Man," also known as "Dr. Tulp."

The Barye bronzes, exhibited at the American Art Galleries in connection with the much heralded "Angelus" of Millet, and a large and fine collection of the Fontainebleau School, are well worth seeing and studying, not only for Barye's modelling and composition, but also as giving an opportunity rarely to be enjoyed of studying the resources and triumphs of modern bronze casting and finishing. There are some gems in the way of bronze texture and coloring that are equal in their way to many of the Japanese. Barye, as an artist, seems to me at his best in his single figures of lions and tigers: he succeeds in these in giving one an impression of wonderful naturalism and subtle decorative quality combined, whilst the more complicated compositions seem to have excessive action and confused and ineffective composition.

The "Angelus" and the paintings of the Fontainebleau School I will not attempt to describe. There never before has been brought together in one collection such Corots, Daubignys, Rousseaus and many other of the great landscape painters, and it is nectar and ambrosia. The whole history of the acquisition of Millet's reverently simple masterpiece savors of our great and only Barnum, and although it may be construed as a tribute to the genius of Millet, I feel very sure it is not the manner of homage that would be tolerable to him if alive.

SOCIETIES.

PHILADELPHIA T-SQUARE CLUB.

THE first regular meeting of the Philadelphia T-Square Club for the year was held at the office of Mr. Lindley Johnson, architect, 512 Walnut Street, Philadelphia, on Wednesday evening, November 6.

After the reading of the Treasurer's report the Club proceeded to the election of officers, with the following result: *President*, Louis C. Hickman; *Vice-President*, F. M. Day, architect; *Secretary and Treasurer*, G. C. Parmeter; *Executive Committee*, Walter Cope, architect, Amos J. Boyden, architect, Lindley Johnson, architect.

The following-named gentlemen were then elected to membership: H. B. Bancroft, Mr. Swarthmore, E. T. Boggs, A. Lacy, J. J. Bissiggar, J. Jameison, J. A. McArthur Harris, J. Barton Keen, W. J. Noland, E. H. Davis, thus increasing the total membership to 49.

The subject of the evening's competition was "A Drinking-Fountain in a Blank Wall." Drawings were contributed by Louis C. Hickman, W. J. Noland, J. J. Drell, A. C. Munoz, Percy Ash, Wilson Eyre, architect, Charles Brooke, Frank Hays and Frank Mead, architect. Mentions were awarded as follows: First place, Louis C. Hickman; second place, Wilson Eyre; third place, Frank Hays. The mentions, with about 27 other drawings, have been sent by the Executive Committee as club exhibits to the Cincinnati Exhibition.

Last year's prizes, amounting in all to about $70, were awarded to Mr. Arthur Truscott, Mr. Louis C. Hickman and Mr. Frank Hays, first, second and third place, respectively.

The Club prizes are paid in money, and will amount, this year, to $100 or more. The money will be raised by voluntary subscriptions from the members, augmented by a sum voted for the purpose from the general fund.

LOUIS C. HICKMAN, *President.*
G. C. PARMETER, *Secretary.*

ST. LOUIS ARCHITECTURAL LEAGUE.

THE first annual meeting of the League was held Saturday evening, November 9, at their rooms, 515 Olive Street, and, after electing officers, listened to some interesting speeches from invited guests.

There was a preliminary business meeting from six to eight o'clock, during which time the election of officers took place, resulting as follows: *President*, C. F. Longfellow; *Vice-President*, Gustave Wuest; *Treasurer*, J. L. Wees, re-elected; *Secretary*, L. H. Seubert, re-elected. Messrs. D. D. Kearns and M. P. McArdle, with the officers, are the *Executive Committee.* At 8 P. M. the rooms were thrown open for the reception of the friends of the League. Among the prominent gentlemen present were: Prof. Halsey C. Ives, of the Washington University, P. P. Furber, T. C. Link, C. E. Illsley and Charles K. Ramsey, Dr. John Green, Robert Bringhurst, the sculptor, and Holmes Smith, the artist.

L. C. Bulkley, retiring President, formally opened the meeting at 8.30, and spoke of the origin, objects and growth of the League, and what had been accomplished in the first year.

He was followed by Mr. P. P. Furber, C. E. Illsley, C. K. Ramsey and Prof. Halsey C. Ives, who gave a highly interesting review of the fine-art work connected with Washington University. He began by referring to the fact that his first work in St. Louis, seventeen years ago, was done in the room in which he was speaking.

Mr. Ives paid a handsome tribute to Mr. Wayman Crow, the founder of the Museum of Fine Arts. He dwelt on the advantages to be obtained in this institution by the younger members of the League, who were invited to avail themselves of the pictures, drawings and designs to be seen there, and concluded by offering to the members of the League the courtesies of the Academy and Museum at any time.

Mr. John Green and other prominent gentlemen followed, after which a splendid collation was spread.

Mr. P. P. Furber then announced the award of the first annual prize competition, the study being an entrance to a public park, which resulted in giving to L. H. Seubert first prize, Mr. C. F. Longfellow second prize; the judges being Messrs. P. P. Furber, T. C. Link and W. E. Eames. After a careful examination of the work done in the past year, the members were heartily congratulated on the grit and determination with which the younger members of the organization had stuck by the enterprise. The meeting was adjourned, to meet in two weeks, November 23.

PHILADELPHIA CHAPTER, A. I. A.

THE Philadelphia Chapter, American Institute of Architects, held a meeting on November 5, at 8 P. M., and elected the following officers: *President*, T. P. Chandler, Jr.; *First Vice-President*, George C. Mason, Jr.; *Second Vice-President*, Lindley Johnson; *Secretary*, Amos J. Boyden; *Treasurer*, Walter Cope; *Executive Committee*, Isaac Purcell, T. Roney Williamson.

COMMUNICATIONS.

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

WALL-CHARTS FOR ARCHITECTURAL HISTORY.

CHICAGO, ILL., November 11, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — Please inform us if there is any series of wall-charts to illustrate "*History of Architecture.*"

Yours truly, J. H. TEWSBURY.

HUNT'S "SHADOW OF DEATH."

ITHACA, N. Y., November 14, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — Will you kindly inform me, if possible, what European gallery or collection contains Mr. Holman Hunt's "Shadow of Death," and greatly oblige, STUDENT.

[AFTER being exhibited in the chief cities of Europe and the United States by Messrs. Agnew, who had paid 10,000 guineas for it, this picture was presented by them to the City Art Gallery of Manchester, England, where it now is. — EDS. AMERICAN ARCHITECT.]

NOTES & CLIPPINGS.

COMPARATIVE COST OF WATER-POWER AND STEAM-POWER. — A very thorough examination into the relative cost of water-power and steam-power has been made by Chas. H. Manning, of Manchester, N. H., in a paper recently read before the American Society of Mechanical Engineers. The author takes the water-powers at Manchester, N. H., and at Lawrence and Lowell, Mass., as his standards for that side of the calculation, and for steam-power he takes the steam-engines used in the same towns for manufacturing purposes, where the cost of coal is $4.50

per ton. The conditions greatly favor the water-power side, although all these water-power privileges are permanently capitalized, and under the original leases paid $10.55 at Lawrence and $10.42 at Manchester per horse-power. Under recent leases their prices have been advanced at Lawrence to $14.08 per horse-power. After making elaborate calculations as to the practical additions and abatements required in putting both to use, the author sums up the cost in each case, and says: "In the water-power plant we paid $14 for the cost of the water, simply, per horse-power per annum; add to which $8.62 for attendance and supplies, we have a total cost for water-power of $22.62 per horse-power per annum." And taking for steam a low-pressure plant of 1,100 horse-power, with compound engines run on one and three-quarters pound of coal per horse-power, with coal at $4.50 per ton, the total cost for steam is given at $21.16 per horse-power per annum. "On a 1,000 horse-power plant the difference in cost saves an engineer's wages." We doubt not, says *Iron*, this decision in favor of the cheaper steam-power will surprise many who have supposed that the cities on the Merrimack had a great advantage over our Pennsylvania towns in the cheapness of water-power as compared with our coal. As coal is obtained for steam-power much below $4.50 per ton, it is evident that our advantages are much greater than those claimed for steam in Massachusetts. — *Scientific American.*

New Statues for the Pavillon de Rohan. — On the wall of that part of the Louvre known as the Pavillon de Rohan, and facing the Rue de Rivoli, standing in niches on each side of the gateway, are eight statues — Kleber, Hoche, Marceau, Desaix, Ney, Soult, Lannes and Massena. They were all instruments of the ambition of the first Napoleon, but they also distinguished themselves as soldiers of the Republic. They were not, however, the sole representatives of militant France at the end of the last century, although it might be supposed that they were selected on that account It is now proposed to put forty-six additional statues in the niches of the same façade, and as peace hath her victories as well as war, there will be figures of men who never drew a sword, and women who were as ignorant of the tented field as any spinsters. Carnot, the organizer of victory, the President's grandfather, will have the honor which was hitherto denied to his memory. Bouchardon, the sculptor, who in 1752 was one of the tenants of the Louvre, is also to appear. Joan of Arc may fitly stand near the warriors, but it will be well to keep her apart from celebrities such as Madame de Sevigné and Madame de Staël. M Guillaume, the architect who has charge of the Louvre, asks permission of the Government to expend 200,000 francs on the new sculpture. It is to be hoped part of the money will be used for statues of some of the members of his own profession who were attached to the works-department of the Louvre. The names of the architects employed from the fifth to the thirteenth century are unknown, but from Robert de Luzarches and Pierre de Montereau to Louis Visconti there is a record of many great artists who deserve recognition. — *The Architect.*

The Cost of Baron Haussmann's Work in Paris. — The memoirs of Baron Haussmann, the man who, under Napoleon III, transformed Paris almost as completely as the Emperor Nero did ancient Rome, can hardly fail to attract attention among foreigners as well as Frenchmen, as the baron has things of much interest to tell us of the French capital and French society in the time of the empire. The expenditure necessitated by the transformation of the city had never been known with anything approaching to accuracy, and the baron, who should be the best possible authority on the subject, now informs us that the process of pulling down old Paris and building the new, cost no less a sum than 5,000,000,000 francs, which is just the amount of the indemnity paid by France to Germany at the close of the last war. Two hundred millions sterling appears a very heavy sum to pay for renovating a single city, and building critics would no doubt like to see the details of this vast outlay, which it is to be feared, the baron is hardly likely to give them in the forthcoming volumes. What the author has to tell his readers about Prince Bismarck and the negotiations after the war of 1870 to 1871 is not less interesting than the facts he promises us with reference to the rebuilding of the French capital. That the German statesman should have been disposed to enter into an alliance with France, and to give her the Rhine as a definite frontier, is, perhaps, possible; but it will be somewhat surprising if Baron Haussmann's statements on the subject, somewhat compromising as they seem to be to German diplomacy, are allowed to go unchallenged in Berlin. — *London Standard.*

A New Lumber Raft. — James B. Leary of New York, builder of the famous Joggins raft, was in St John, N. B., recently, and went through to the scene of his former operations, where he intends to construct another raft as soon as the snow will permit. He will send seventy-five men and some fifty teams in the woods and get out 60,000 sticks. One-half of these will go into the proposed raft. It will be built on the same patent as the others, but will be 100 feet longer than the Joggins raft, having a total length of 750 feet and a width of 45 feet. It will be 45 feet deep and will draw about 25 or 26 feet of water. It will consist of from 27,000 to 28,000 sticks, and will weigh 11,000 tons. It is intended to have six masts rigged, with fore-and-aft sails. The greatest improvements over the former raft will be in the steam steering gear and the steam capstan for the handling of anchors and chains, with which it is intended to equip this leviathan. Mr. Leary says it will be built entirely of piling and spars and will have about 1,000,000 feet of hard-wood for a core. The intention is to have the raft ready for launching in May. — *Exchange.*

Driven-Wells at Albany a Failure. — The determined and costly attempt which was made at Albany to obtain an adequate supply of water from driven-wells appears to have failed. The contractors guaranteed a supply of 15,000,000 gallons a day, but as yet from 390 driven-wells a supply of but about 6,000,000 gallons a day has been obtained. Professor Mason, of the Rensselaer Polytechnic Institute of Troy, in speaking of the subject recently, stated that Albany needed a supply of 20,000,000 gallons of water daily, and at the rate at which the wells are now yielding it would require about 1,200 wells to furnish this quantity. Professor Mason believes the Hudson River to be the only adequate source of supply upon which the city can depend, but says that the river-water should be thoroughly purified, and favors the adoption of a complete modern filter plant for this purpose. — *Fire and Water.*

Boston's Early Fire Laws. — Boston was probably the first town in America which adopted a fire district law. In Smith's Cyclopedia of Boston and its vicinity is quoted a description of the appearance of the city in 1687. Among other things the author says: "The town is almost wholly built of wooden houses; but since there have been some ravages by fire, building of wood is no longer allowed, so that at this present writing very handsome houses of brick are going up." It is noteworthy, by the way, that a very large part of the old houses of Boston which still stand have outside walls either wholly or in part constructed of brick. Brick and terra-cotta would seem to be by long odds the most reliable and lasting building materials which we have in use. — *Fire and Water.*

Cement on Wood. — Wood, says the *Bauzeitung*, which is to be coated with cement, should be rough, not smooth. The best coating is produced by the mixture of one part of cement, two parts of fine sand and one part of curdled milk. Not more should be made of the composition at the time than can be laid on in half-an-hour, and during its application it should be stirred continually, so that the sand does not settle. It is better, with the object in view, to apply two coatings, the second being the thicker. Such a coating adheres well to wood, and affords a good protection against rot, and even, to some extent, fire. Another method is to mix good fresh cement with curdled milk until attaining the thickness of oil paint, and then apply it to the wood. — *The Builder.*

TRADE SURVEYS

Financial and commercial managers are endeavoring to forecast probabilities for the next two years in order to reach conclusions that they can act upon at this time This is a dangerous experiment: first, because conditions two years hence cannot be safely anticipated, and second, because entirely new factors and agencies are entering into the arena of business. It is only a few years ago that the wiseacres were saying with lamentations that the country's capacity in six months was equal to its consumptive-capacity for twelve months. Since then capacity has been fully doubled, and to-day manufacturing interests in several branches are working day and night, and straining every energy to keep buyers wants supplied. With the blowing-in of blast-furnaces now under construction, the capacity will be a trifle under ten million tons per year, and it is a question if even this will supply buyers. It is useless to attempt to estimate requirements for the future, and capitalists, investors, promotors and all others who are pointing their spy-glasses towards the future can see nothing whatever to guide them at present. Wheat, corn and cotton cultivation have received the strongest stimulus this year they ever received, and the cultivators of these products are all preparing to expand the areas devoted to each. It is this expansion, or rather the preparation for it, that underlies the existing activities in all Western and Southwestern States. Experts and advisers of large Eastern financial interests have quite recently about completed preliminary arrangements for the erection of an immense but unknown amount of manufacturing-capacity in these new sections. Much of this activity is hidden under the management of trust companies which have their modest headquarters in Northern cities. The new enterprises may be generally enumerated under cotton, coal, iron and lumber. Over one hundred new railroad-building schemes have taken root, and the territory to be affected extends from the South Atlantic coast to Texas and Colorado. This region of country at present invites capital more strongly than any other, excepting, perhaps, in the one direction of house-building. Builders and architects have recently stated that in house-building the greatest activity will be shown in the belt of States between Pennsylvania and Minnesota.

Records of construction, as far as tabulated this year, show generally an increase over last year of about fifteen per cent, although in a few localities this percentage is greatly exceeded. House-building in the southern belt of States will, no doubt, receive an impetus soon, but it will be through the enterprise of builders and investors, who are only awaiting the settling down to a substantial and enduring basis of the new industries of those States. Already, some so-called "syndicates" are looking up this field for investment. Labor in the South is unsettled, and regularity of employment has been against it, but every year brings conditions up more favorable for the operations of house-builders. The conditions are fast ripening for the construction of thirty or forty thousand houses in two or three hundred of the rising manufacturing towns of the Southern States. As a preliminary step, large purchases of the proper sites have already been made. Trade and industrial conditions are all favorable. Comparison of earnings of every kind justify large operations. Buyers are waiting for supplies, manufacturers are waiting for machinery, machinery-makers are waiting for their raw material, and many shippers of raw material are waiting for cars. The railroads are crowded with traffic. The shops have orders running along for two to four months. The older manufacturing centres are losing some trade through the competition of new centres, and old jobbing centres are surprised at the way new centres are rolling up their monthly and yearly figures. Atlanta, Kansas City, Fort Worth, Omaha, Duluth and other far-off points are planting deep and broad trade foundations. Meanwhile, land is appreciating in value, but, fortunately, slowly. The latest utterances of the labor leaders add to the uncertainty of such a unity of action next spring as will disorganize plans for the year. The vote taken in labor associations reveals something like a lukewarmness among the rank and file, much as some leaders would like to hide the fact. Employers have been granting advances quite freely this year. "Demands" have been quite generally complied with because trade conditions and margins have made compliance possible. This disposition to pay more when higher pay is possible has had its influence on employés. The antagonism that prevailed years ago does not exist to-day, and labor is showing more sense and more foresight.

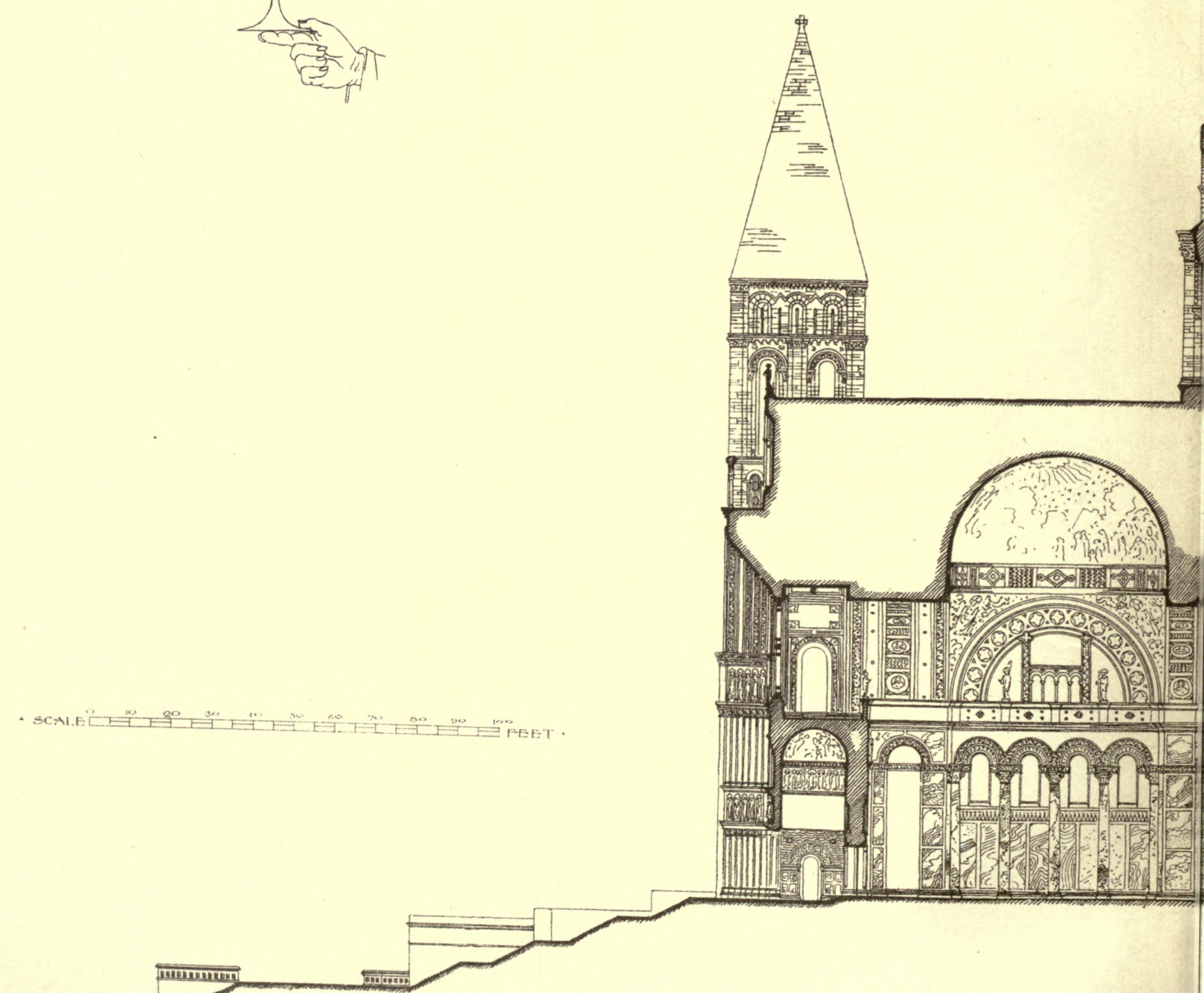
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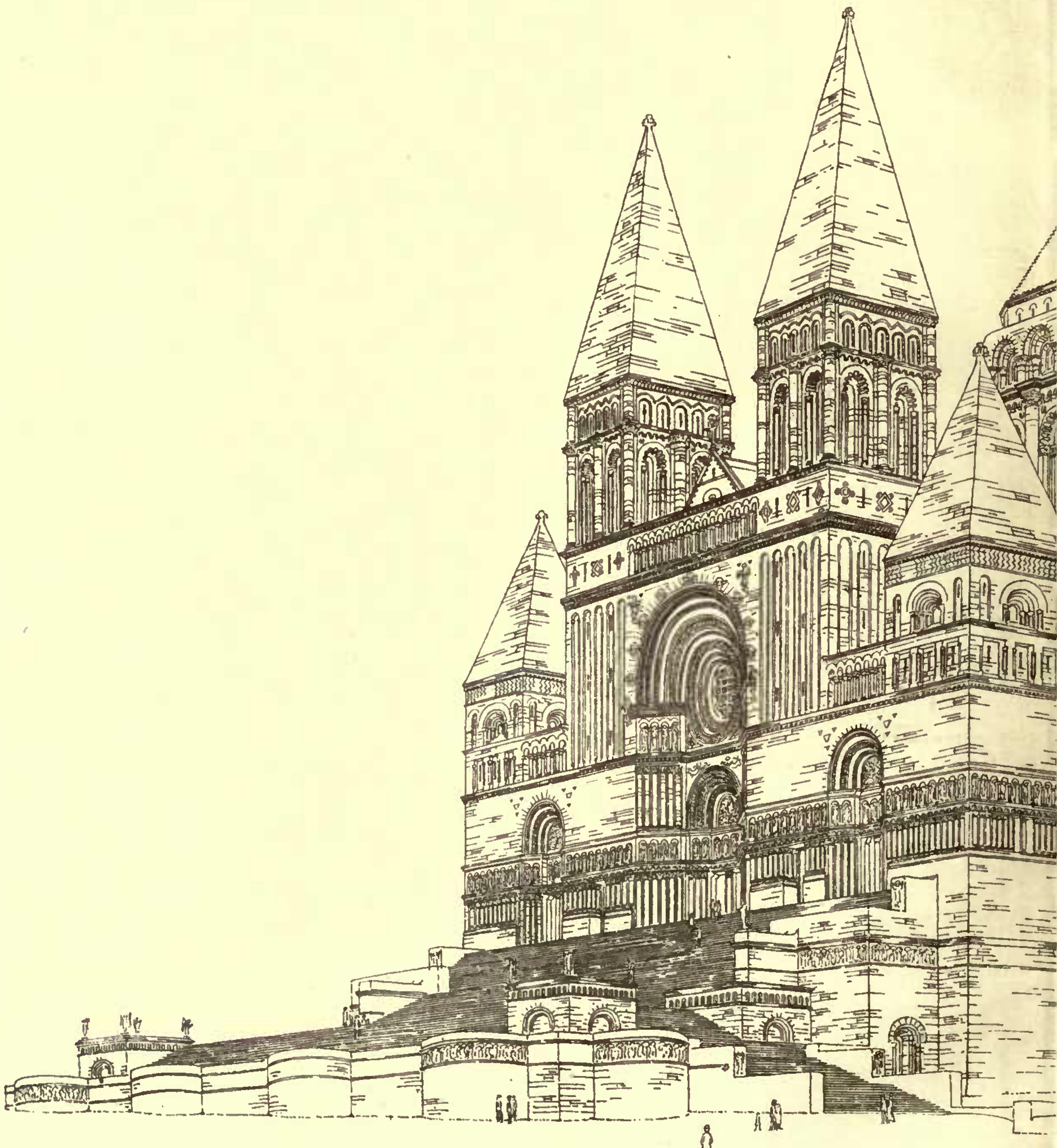




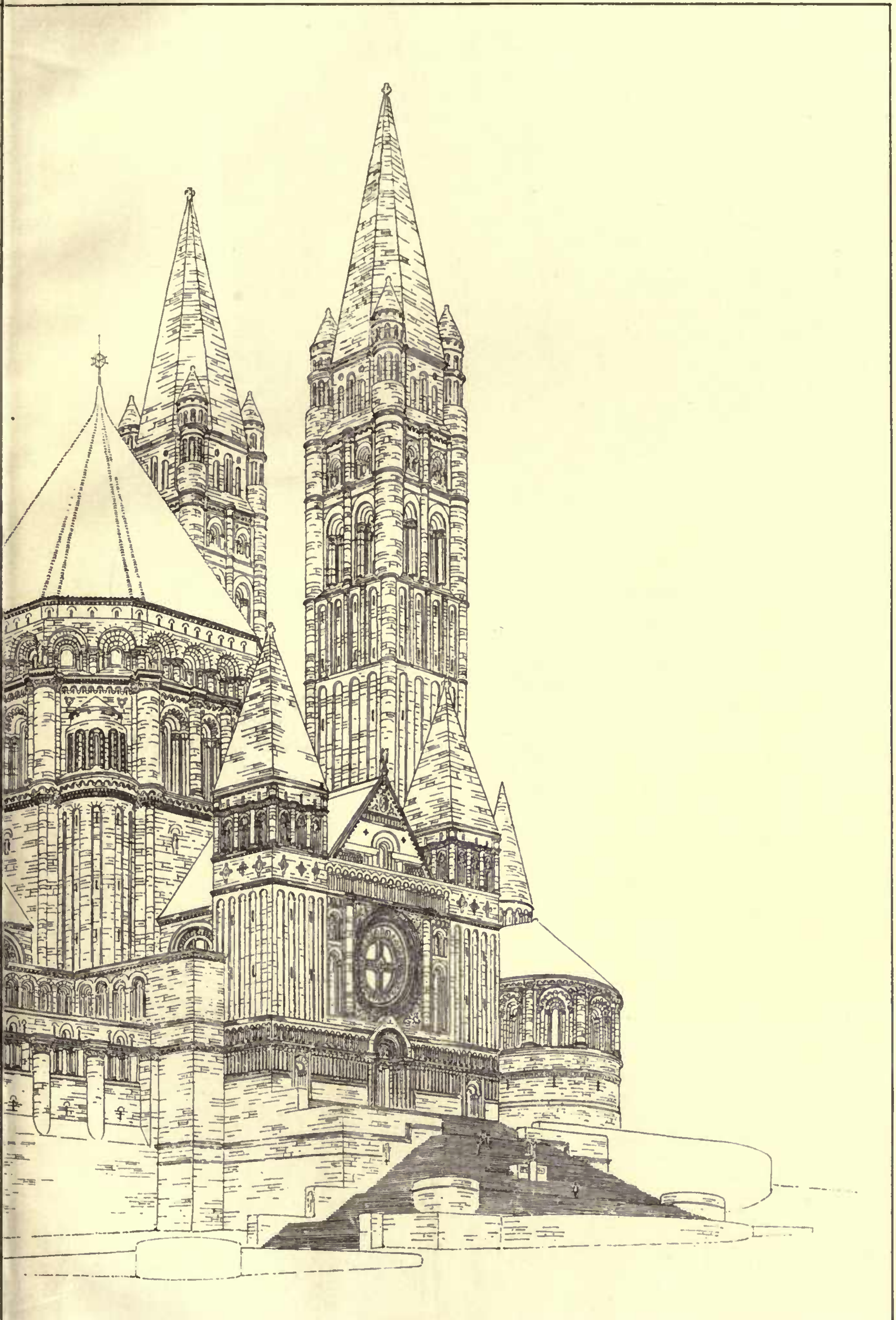
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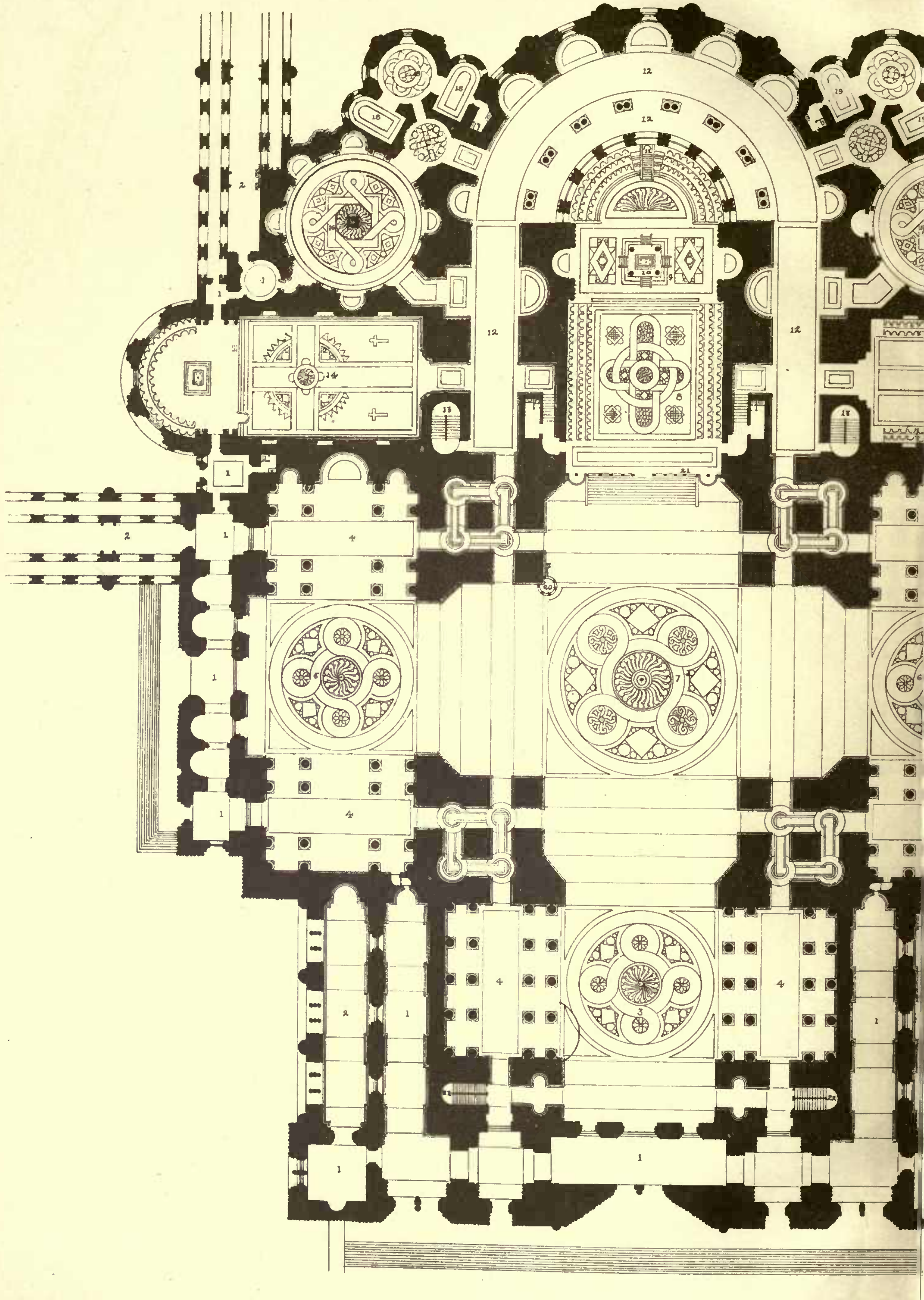
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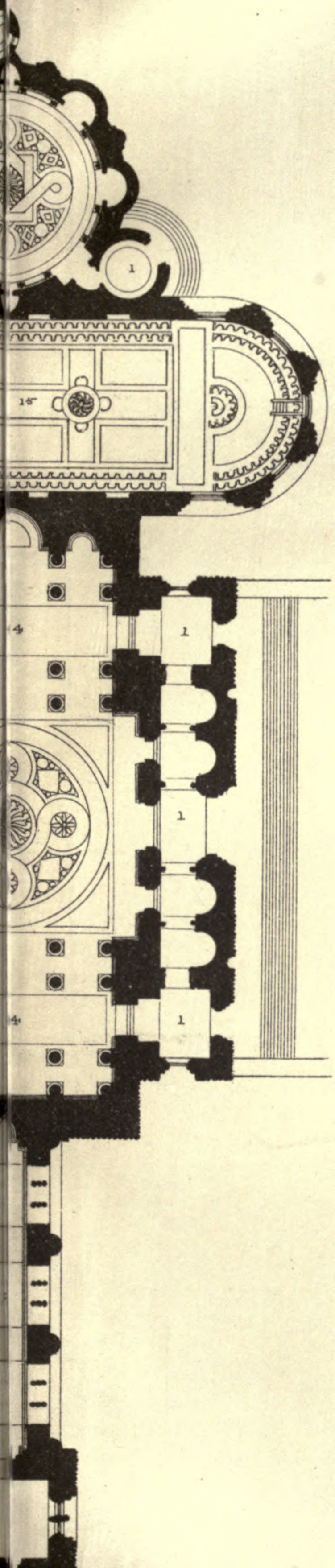


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Plan.

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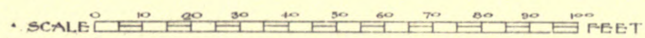
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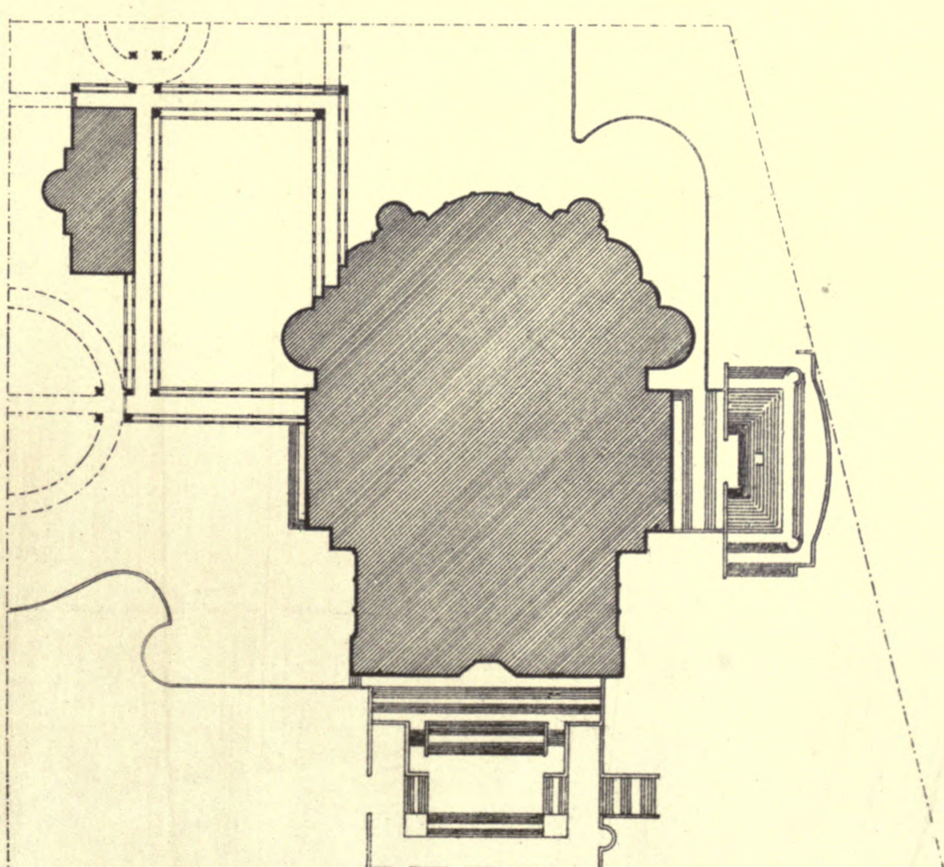
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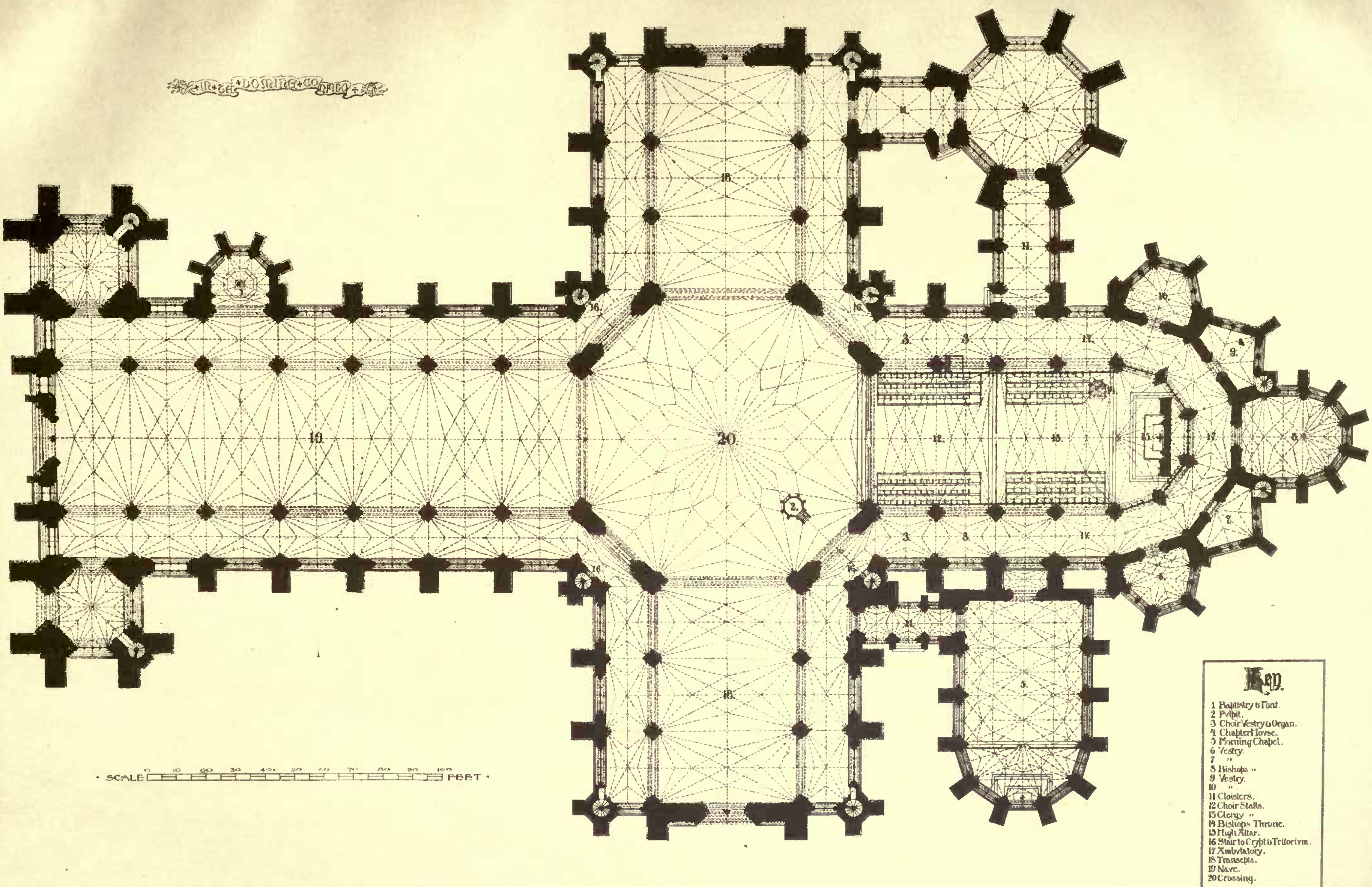


Block Plan.



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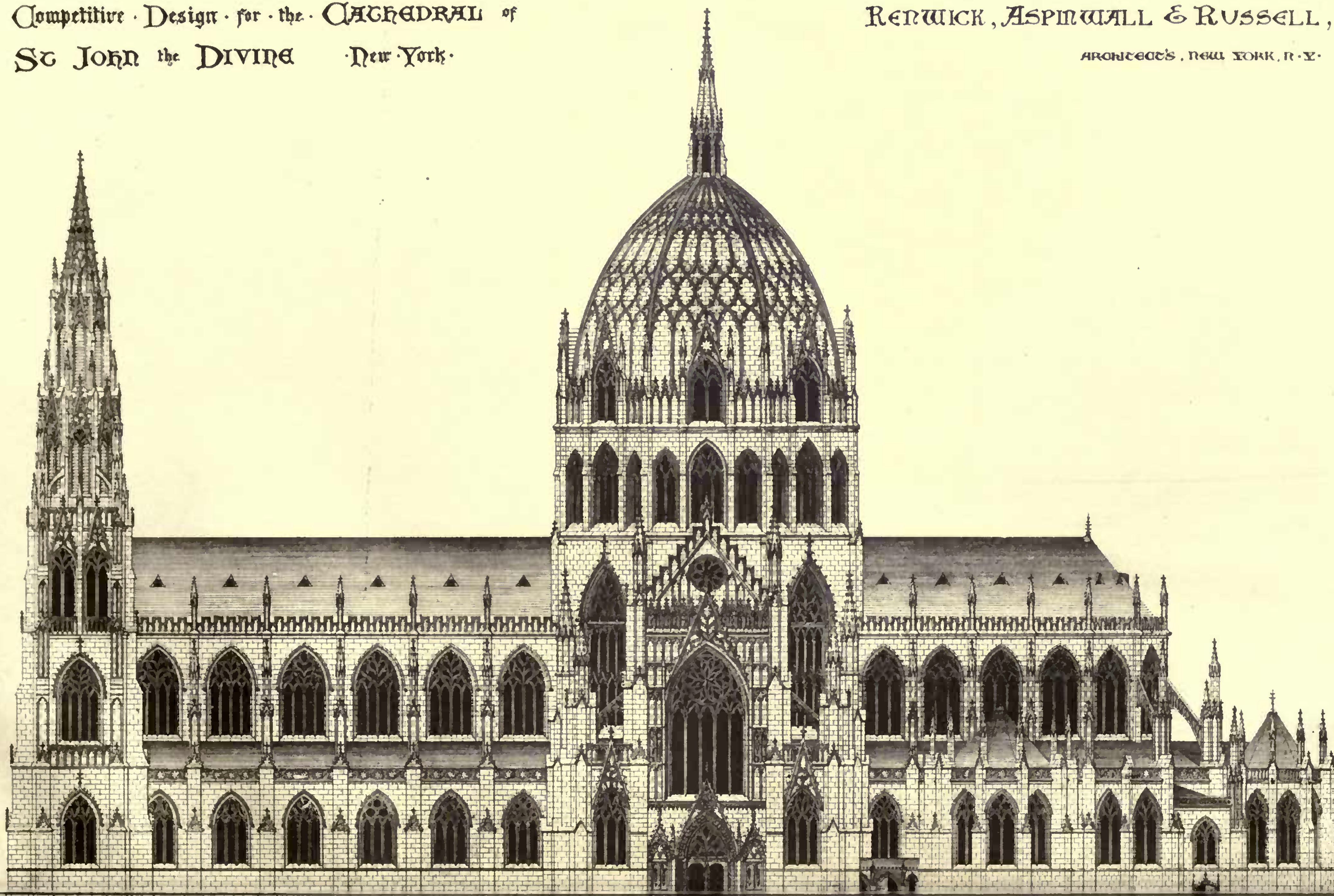


•Ground-Plan•

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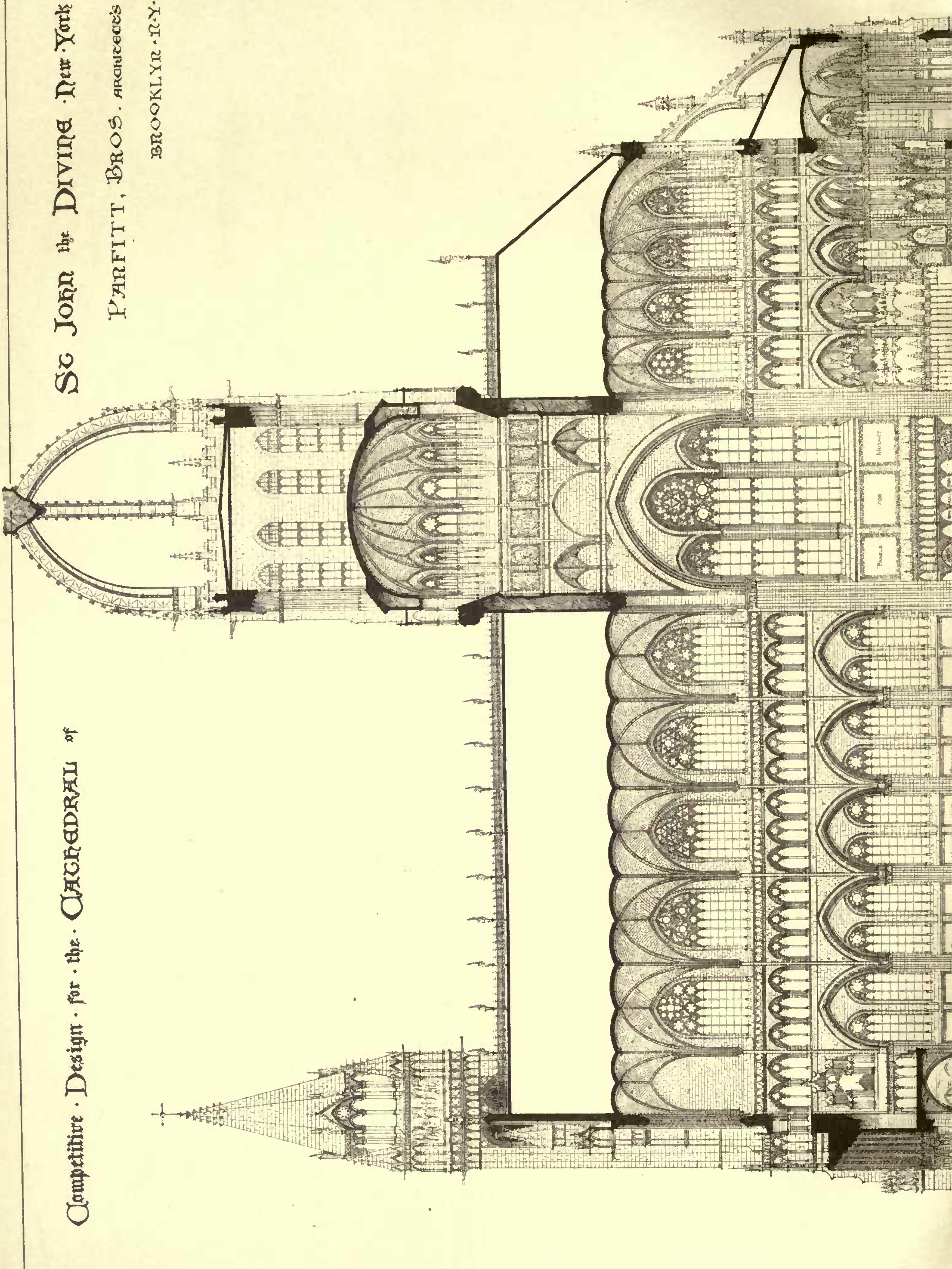
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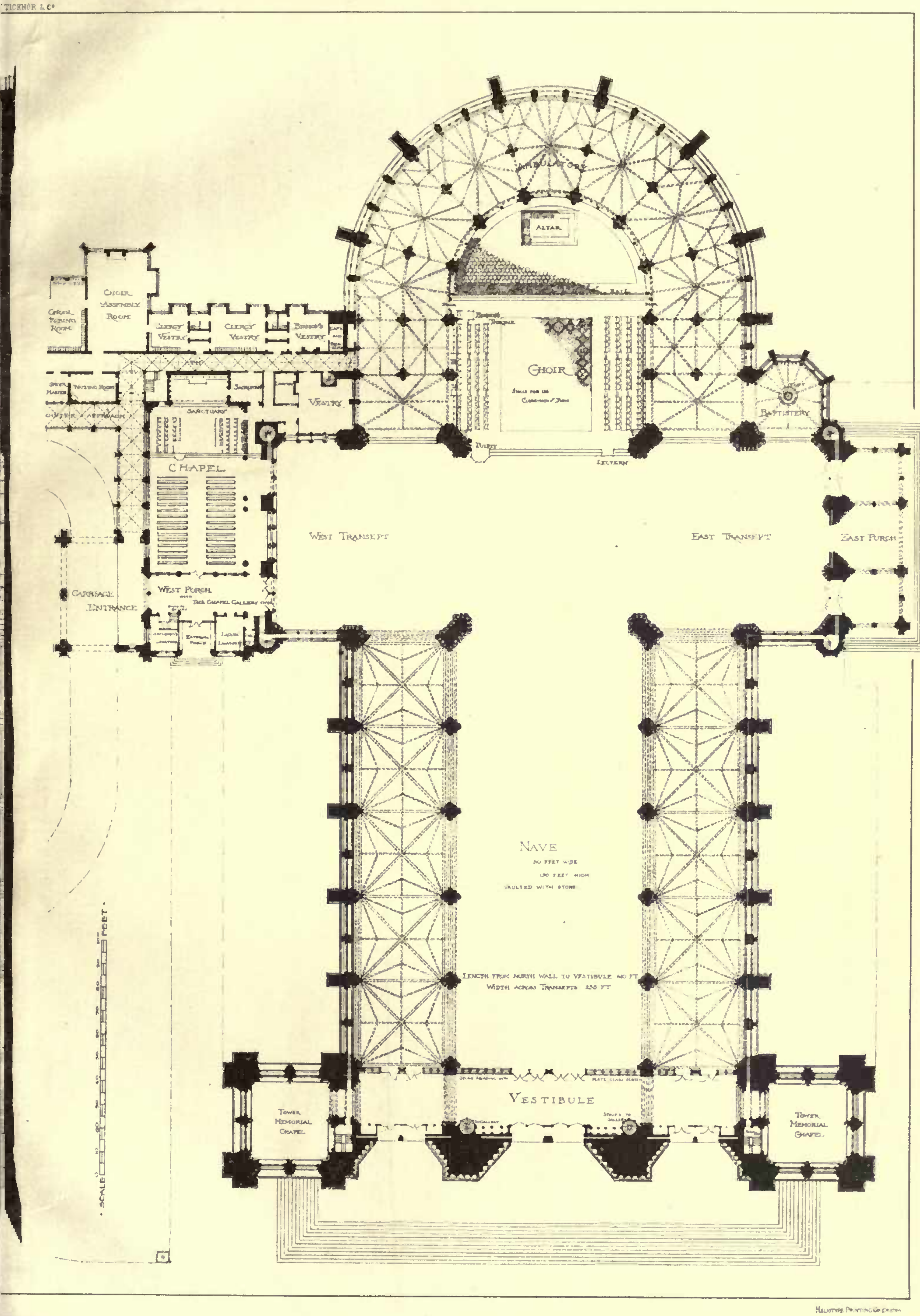


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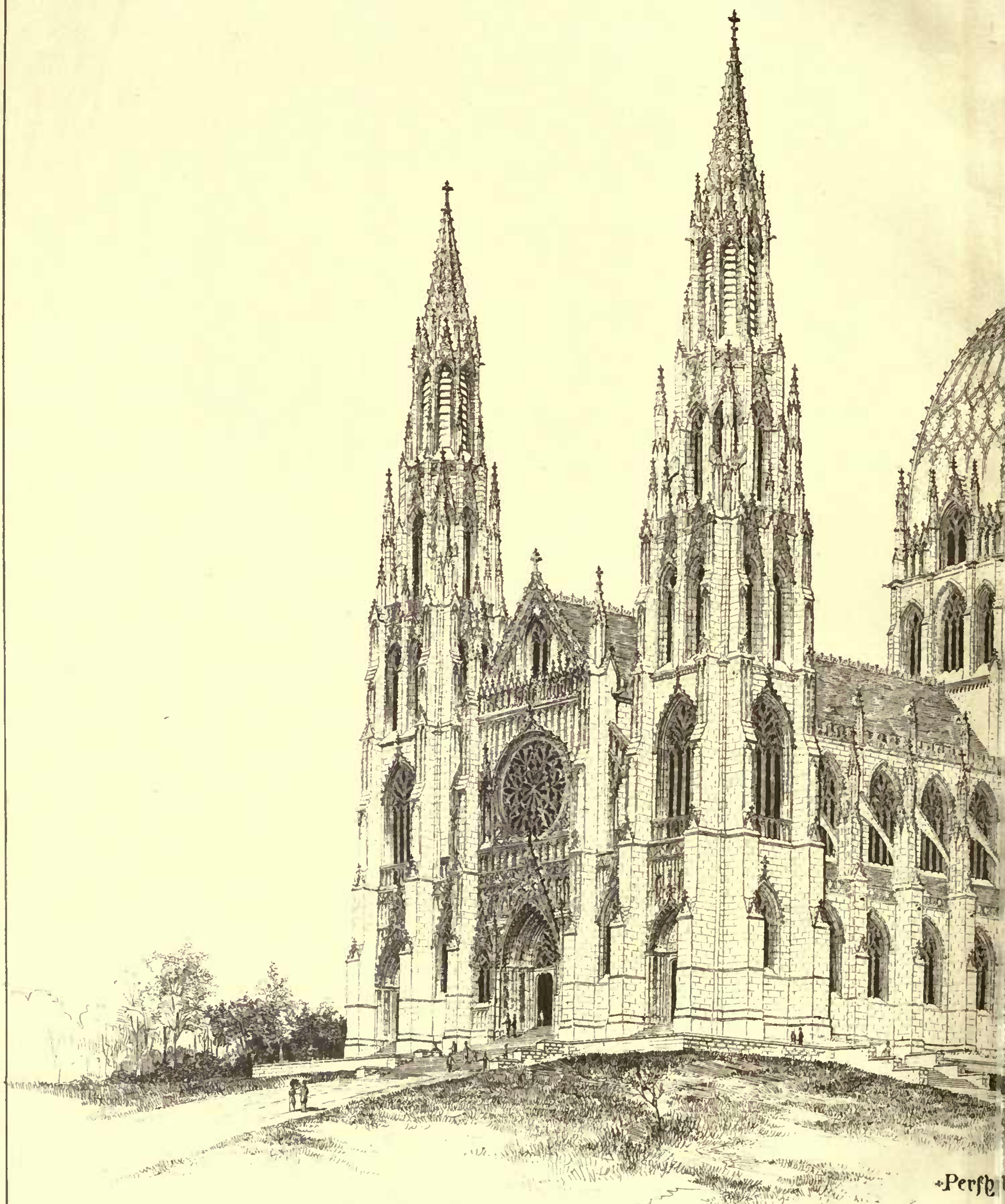


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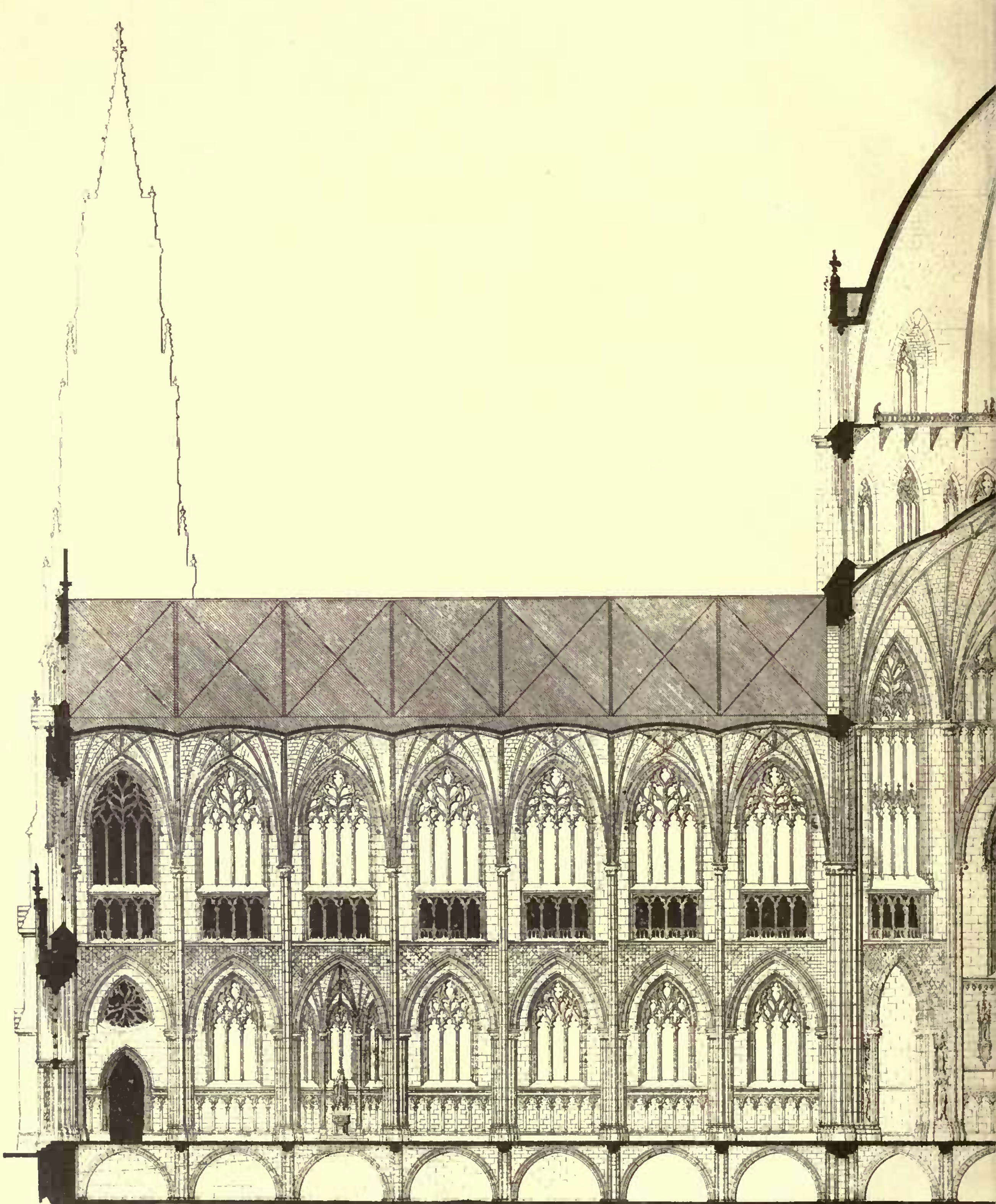


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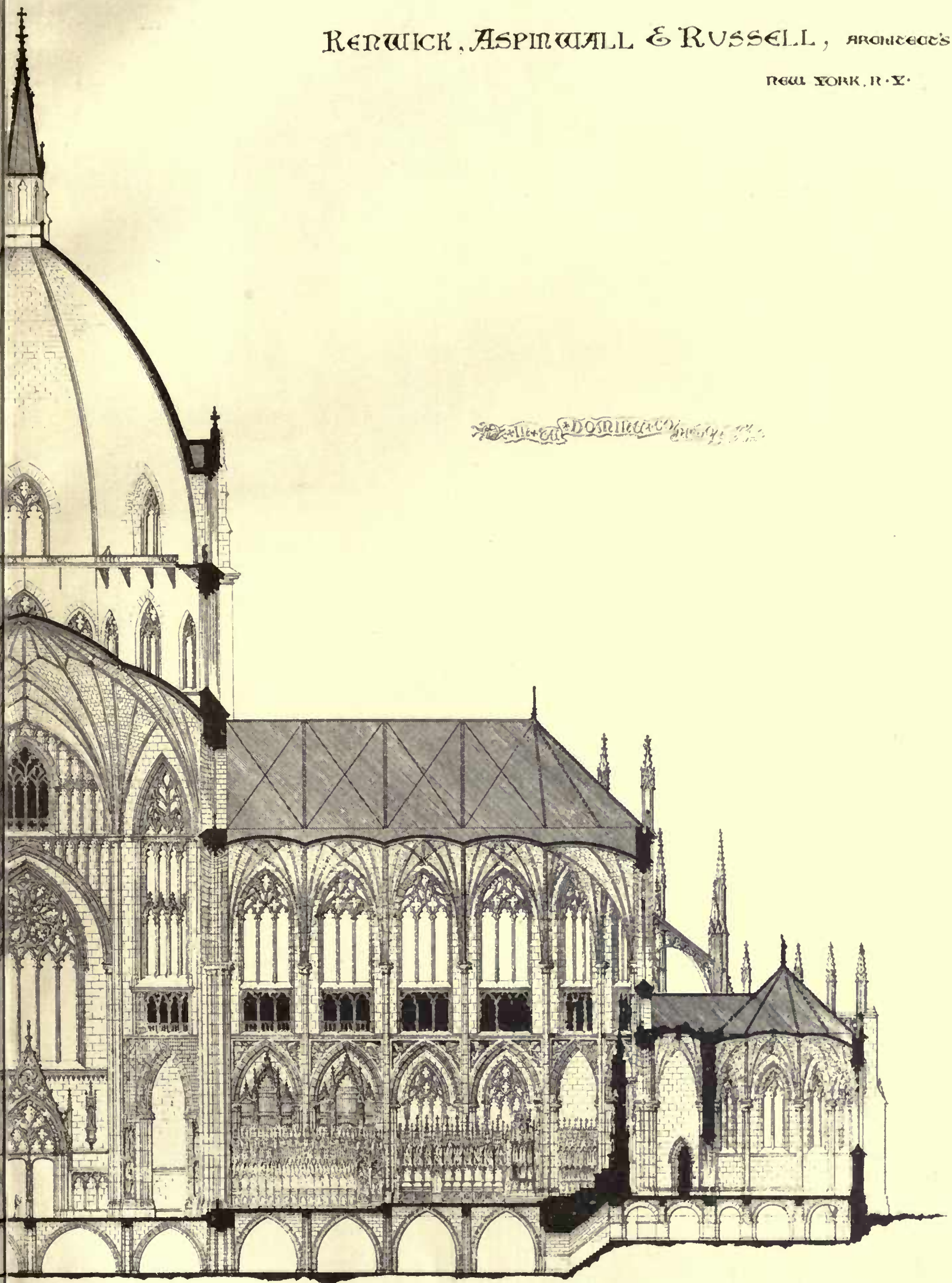


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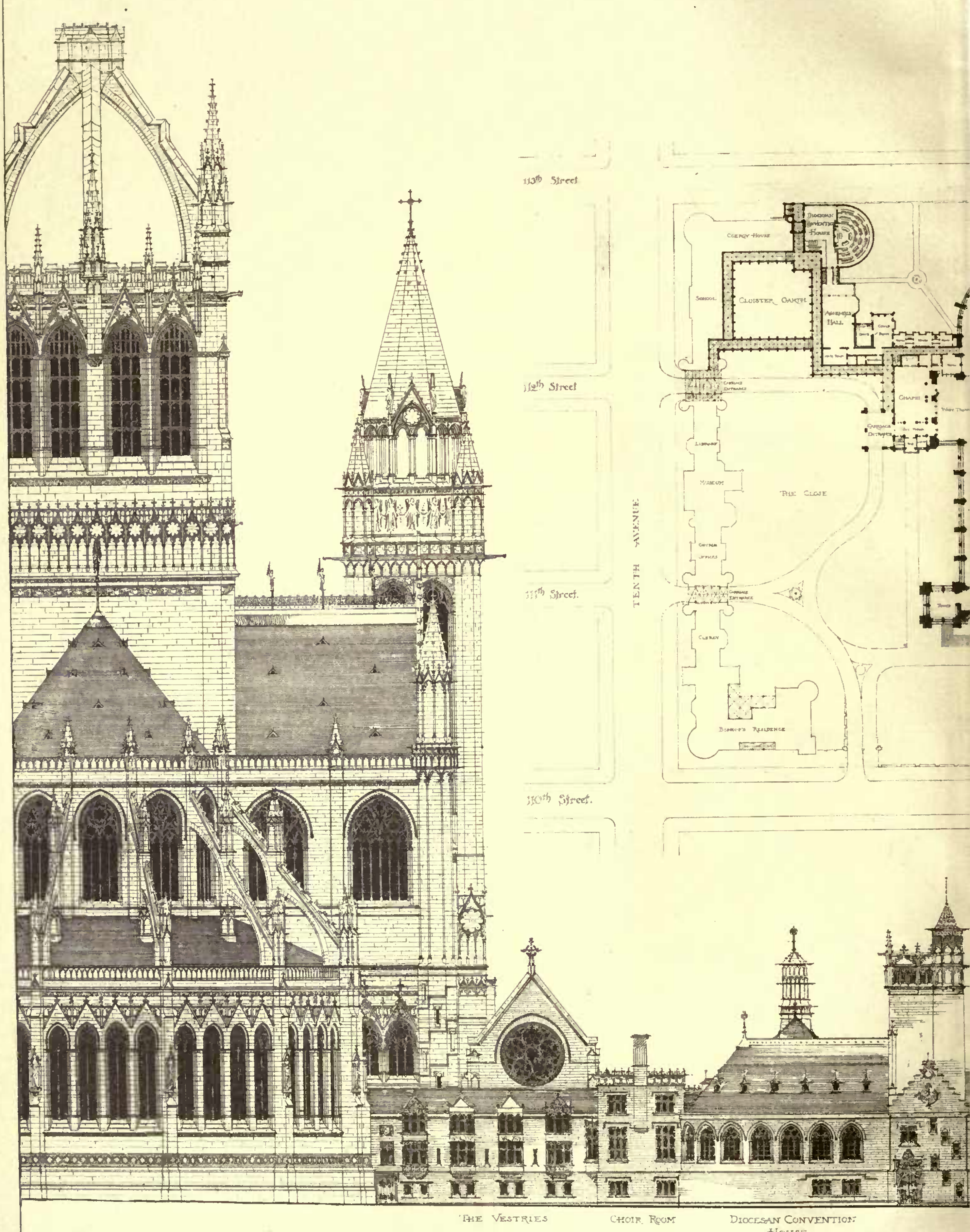
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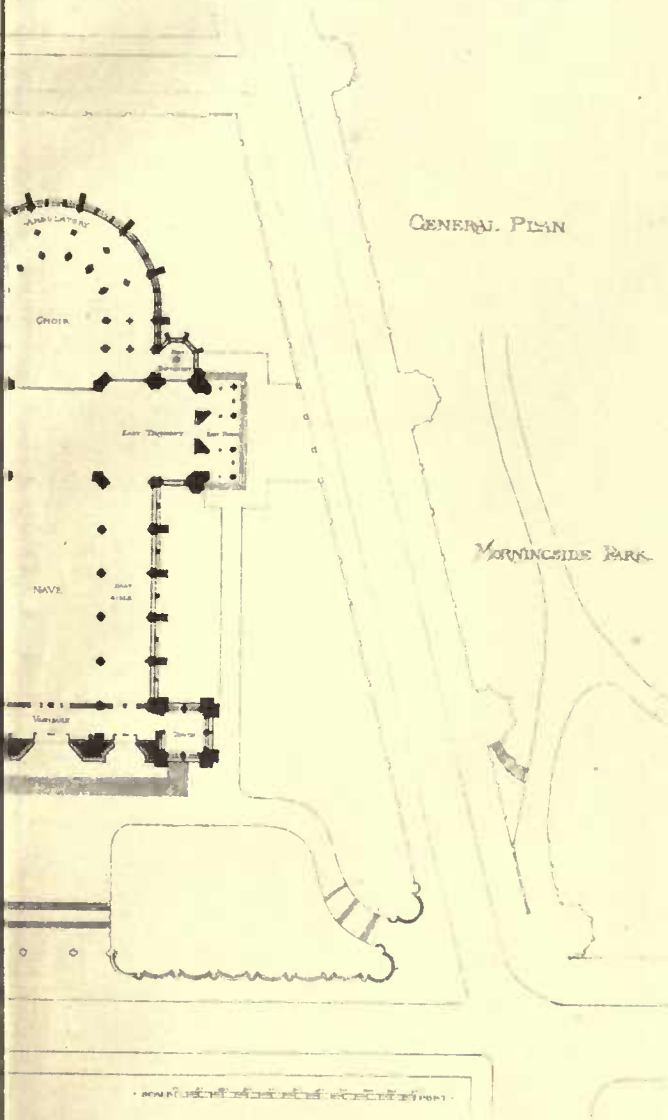
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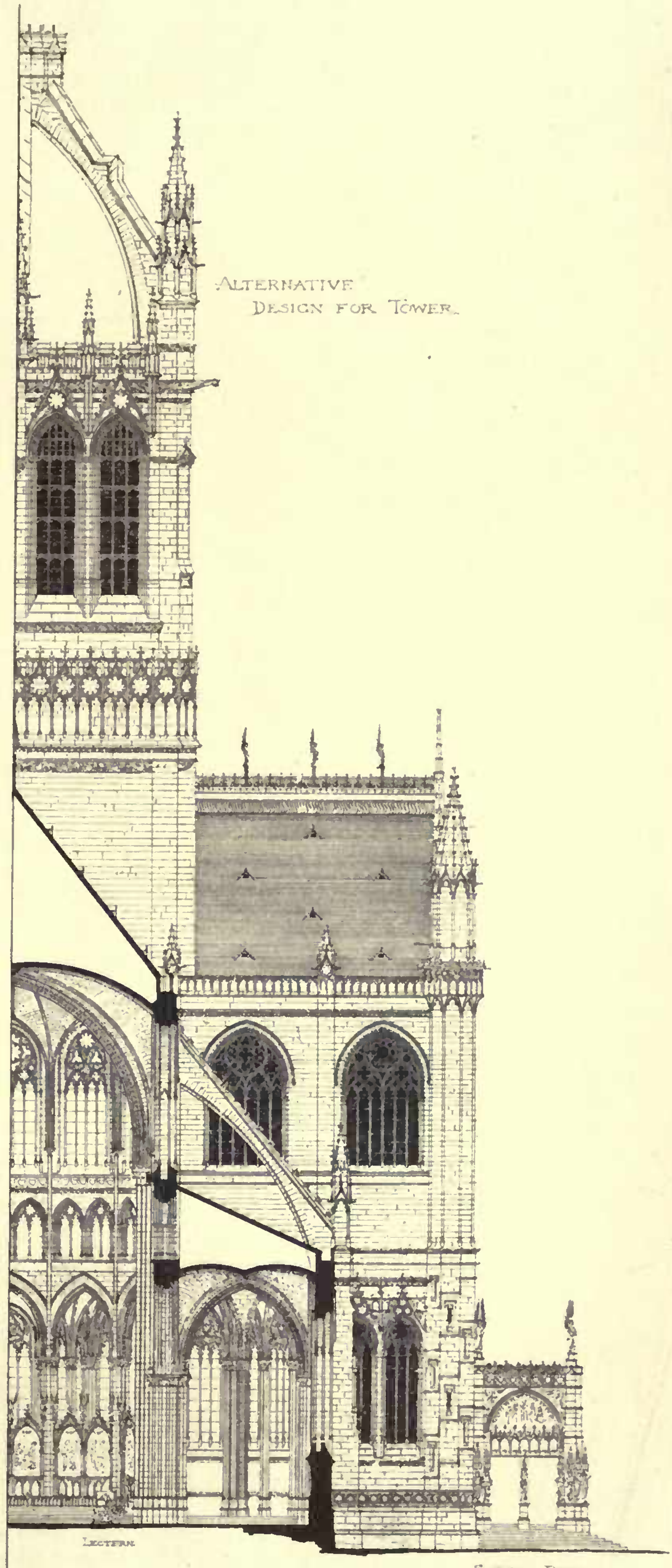
NORTH ELEVATION.

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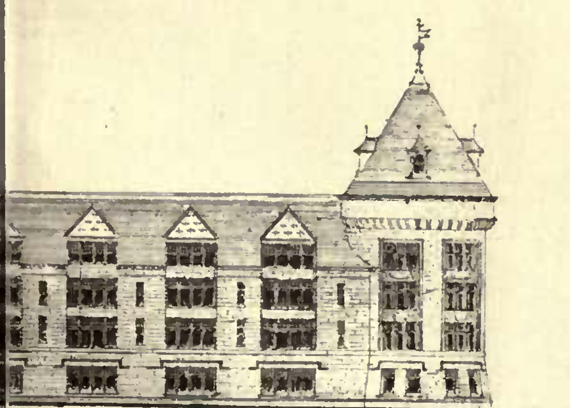


General Plan



Transverse Section.
Looking North

Note. The Crypt is not shown.



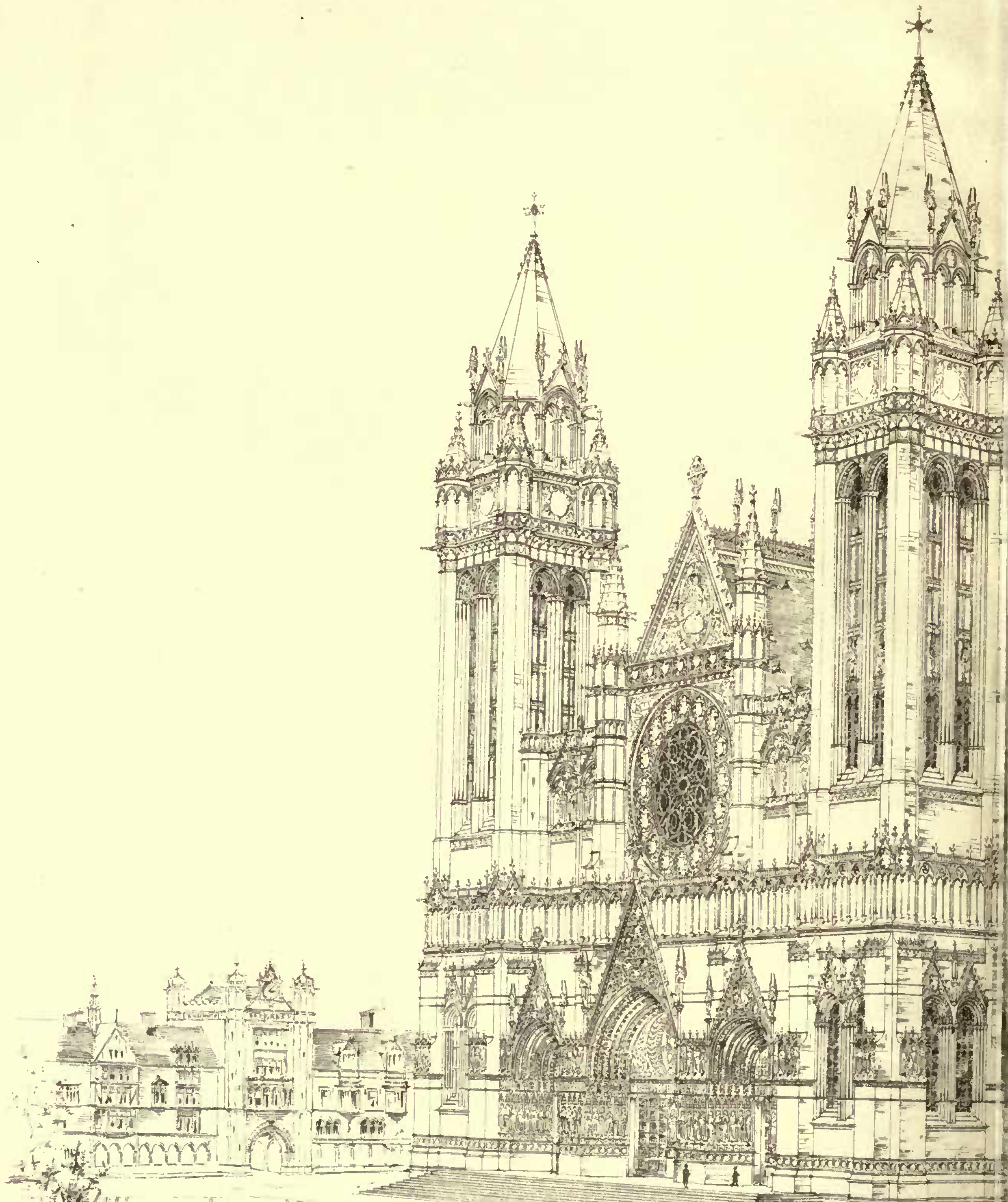
Clergy House

Feet.

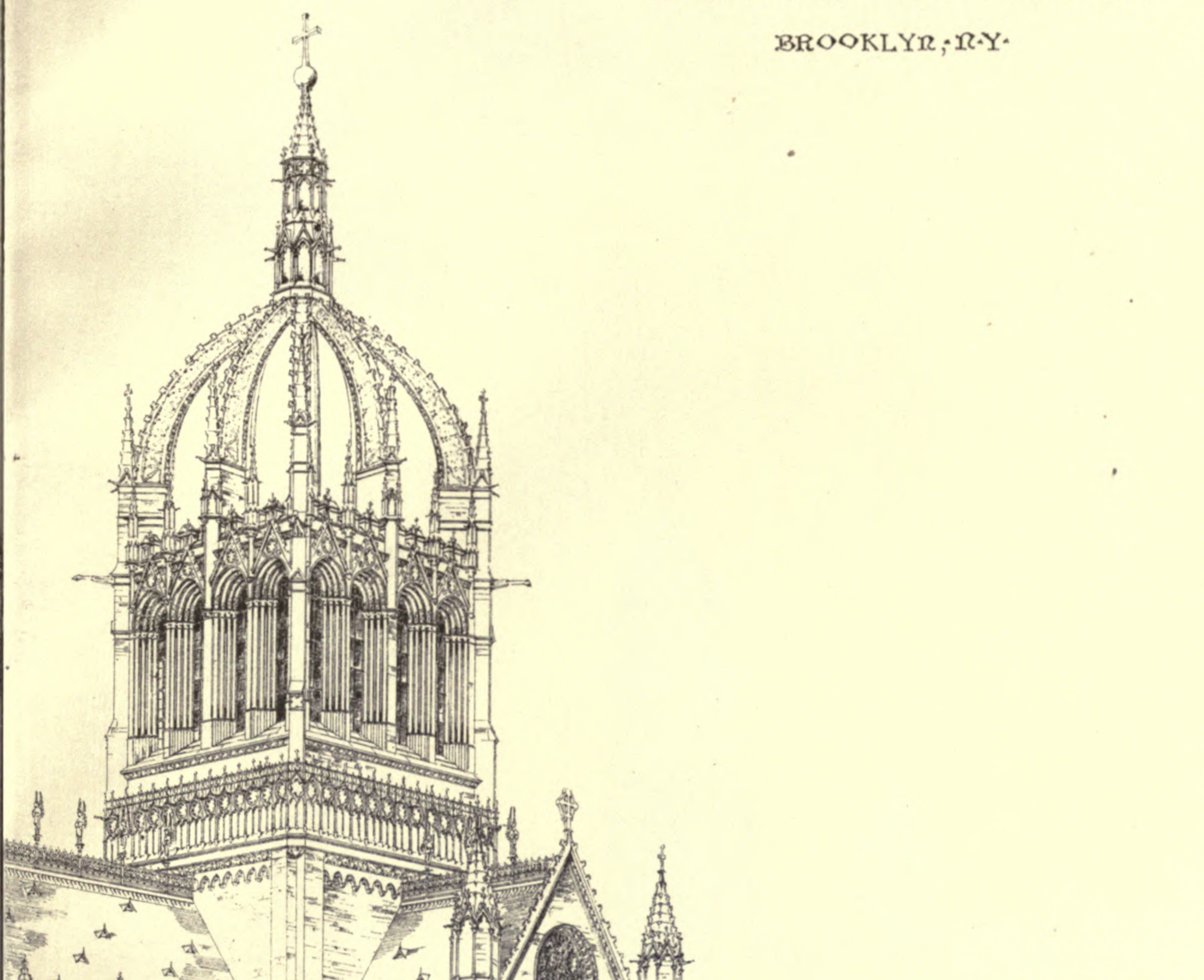
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NOVEMBER 30, 1889.

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WE confess that we sometimes find it desirable ourselves to use the obnoxious circular, but we are so familiar with its failings that the small response that has been accorded to our circular of November 1 has not surprised us; but as about forty per cent of these relatively few responses have stated the intention of the signers to subscribe for our new "International Edition," we have already secured a backing which makes the publication of this edition an assured fact, and for the following year this journal will be published in three editions, the largest and best of which, the "International," will cost the subscriber twenty-five dollars per year. Any of our many readers who threw into the waste-basket, unread, the circular we speak of, because it was a circular, can receive a second copy on application. We must remind our readers that the new edition must, because of the conditions under which its illustrations are to be procured — which involve importations under fixed contracts with parties in different foreign countries — be a limited edition; that is, we must know at the outset how large an edition we require, for we do not propose to carry a surplus stock; and after the edition is distributed it will not be possible to obtain back copies, as reprinting will be out of the question. Therefore it is a chance to be taken or refused now. Judging from the expression of opinion upon this new departure which we encountered last week at Cincinnati, we have never attempted an improvement in this journal which so thoroughly deserved the support of the profession, or which seemed more likely to secure it.

WE find in the St. Louis daily papers accounts, with illustrations, of the competitive sketches for the new City-hall. The terms of the competition provided that six designs should be purchased by the city. For the one selected as the best, five thousand dollars were to be paid, and one thousand dollars each for the five regarded as next in merit, all the plans so purchased to become the absolute property of the city. So far as we can judge from the rough reproductions in the newspapers, the designs seem not to have been of the highest order. The literary bureau appears to be in full activity, and the real opinion of the public generally in regard to the plans cannot be gathered from what the reporters say of them; but if those most extravagantly praised are indeed the most attractive of the lot, we can only say that they must be a sorry lot. Perhaps some of our readers may be glad of the hint afforded by a quotation from one of the accounts. Speaking of a crude, lumpy composition afflicted with a fat tower on one corner, and conceived in the style of a village engine-house, it says: "The plan that attracted the most attention among those present at the opening of the plans yesterday was the one marked ———. It was one of the last opened. When it was displayed the members of the commission and others designated it as a corker. An inspection of the inside drawings of the magnificent structure proposed in this plan shows that the architect who made them knew how to get up plans for a City-hall for St. Louis. The building is not gaudy in appearance, yet it is handsome and stylish. The interior is to be of the finest material and finish, and, above all, every office in the building will, if this plan is adopted, be well supplied with light and air." How the enterprising reporter knew from the plans and elevations of the "corker" that the interior was "to be of the finest material and finish" it would be interesting to learn, but these secrets are not revealed to outsiders. Fortunately for the competitors, the award is to be made with the advice of an expert, and we shall hope to be able later to present a comparative view of the designs, from which our readers can draw their own conclusions as to the qualities which won the suffrages of the judges.

AN attempt is to be made to induce the Legislature of New York to pass this winter a law providing for the licensing of architects in that State, after examination by a competent professional board. The bill offered provides that architects now in practice shall be simply registered, but that all future applicants for a place in the profession shall pass the examination and be licensed by the Board, under penalty of a heavy fine for engaging in professional work without the license required. A small license-fee is demanded, which goes toward paying the expenses of the Examining-Board. We suppose that there is not much probability of the passage of this, or any other bill to prevent free-born citizens from piling up bricks or stone in any form they see fit, notwithstanding the obvious utility of such a law; but patience and perseverance will undoubtedly, in time, bring about a change in public feeling. Meanwhile, it is worth remembering that Legislatures are very much influenced by what is done by the Legislatures of other States, and that the public interest in such a bill, and, in consequence, the probability of getting it passed in any State, would be much increased by having similar measures simultaneously pressed in as many other States as possible. To the legislative mind, the fact that a dozen other States were considering such a bill would give it tenfold the importance that it would claim on its own merits, and it would be strange if the Legislature of one of the States did not finally pass it, for the sake of surprising the other Legislatures, if for no better reason. At the same time with this, it seems to us that good might be done by proposing to Congress to establish, by means of examinations open to professional men of good repute, and under the charge of persons in whom the profession would have full confidence, a grade of Government architects, to whom, exclusively, such public work should be entrusted as it might seem best to assign to private individuals. We do not think it impossible, in the present state of feeling in Congress, that such a measure might be passed at once; and it would not only set a good example to States, but would itself be a great benefit to the profession and the country. While the rank of Government Architect, like the similar one in France, need not imply that its possessor would ever have any public commissions, the fact that he had been adjudged worthy to receive them would have an important effect on his private practice; and, on the side of the Government, the formation of such a class of professional men would greatly encourage the placing of public buildings in the hands of local architects belonging to the class, by removing the fear which now exists, and is not without foundation, that the throwing open of the public architectural service to the whole profession, which at present includes, so far as the public can tell, every one who has been three months to an evening class in mechanical drawing, may lead to blunders and malpractice of various sorts.

ALTHOUGH no one knows why dampness should be so dangerous, or why a moist air should carry infection more readily than a dry one, the establishment of the fact, even without its explanation by theory, has been a great step in sanitary science — one, moreover, to which the world is greatly indebted to Dr. Bowditch, formerly of the Massachusetts State Board of Health, whose demonstration of the connection between dampness and tubercular disease appeared in one of the earliest publications of the Board. Every one does not realize how great, notwithstanding the work that still remains to be done, has been the progress of the modern world in preventing disease. We read our text-books of history, and are surprised to notice how short-lived the heroes of the Middle Ages were, and still more, how rapidly the wives of these heroes died and gave place to new ones, but, on more accurate inquiry, we find that the average duration of life, down to the beginning of the last century, was far less than it is now. The kings of England, unless they fell under the displeasure of their barons, may be supposed to have led comfortable and healthy lives; yet their average age at death, from William the Conqueror to Henry the Eighth, excluding the seven who died by violence, was fifty-five years, and this was then considered a ripe old age. Among the common people, the proportion who reached maturity was far smaller than it is now. At the time of the Conquest, the total population of England and Wales was not over two millions, or just about that of the State of Massachusetts, or of the cities of New York, Brooklyn and Jersey City combined; and the population of the county of Sussex was not more than ten thousand, or about one-fifth of the present population of the village of Hastings, where William landed with his Norman troops. In material comfort, also, the English common people have gained as much as in years. The records of the University of Oxford show that, at the beginning of the twelfth century, the average yield of wheat to the acre on the University estates was not more than eight bushels. In five hundred years, at the end of the seventeenth century, it had reached fifteen bushels, or about twenty-five per cent more than the present average in the United States, and now, two hundred years later still, the average in England is thirty-two bushels to the acre, and in Scotland forty bushels, while in certain Scotch districts, where liquid manure is freely used, fifty bushels to the acre are regularly harvested. With the improvement in agriculture, the condition of cattle and other live stock has improved, both through the drainage of their pastures and the better nourishment and care which they receive, and the Englishman, better and more cheaply fed and clothed than ever before, is now being effectively guarded from the diseases of filth and contagion which were once considered unavoidable. Already, typhoid fever, small-pox, and even diphtheria, are regarded as avoidable diseases, while the causes of consumption and scarlet fever are well enough understood to give some hope of some time being able to avoid them, and, very recently, the sanitary guardians of the public health have ventured to attack, with success, the more violent epidemics. By their efforts in searching from house to house for cases of Asiatic cholera when the disease appeared in England in 1881, and subjecting the patients to a curative regimen in the early stages of the disease, Dr. Chadwick believes that fifty thousand lives were saved in England alone, and perhaps as many more were preserved in other countries by the adoption of the same system.

A VERY great man has just died in England. Dr. James Prescott Joule, who first conceived the theory, the truth of which he established by hundreds of conclusive experiments, that heat is simply "a mode of motion," having its mechanical equivalent, and representing the conversion of a given quantity of an indestructible force from one manifestation into another, from which it can be reconverted without loss into the original form. expired near Manchester about two weeks ago, after seventy-one years of a life of pain and ill-health, but persistent energy and enthusiasm. Dr. Joule was the son of a rich brewer, and, being too feeble in constitution to be sent to school, was educated at home. At the age of fifteen, he was placed as a pupil with the great chemist, Dalton, from whom he derived the inspiration which led him to devote his life to science. When only twenty-five years old, after pursuing for some time a course of investigation into the correlation of heat and chemical energy, he observed that heat was produced by forcing water through narrow tubes, and, by measuring both the force exercised and the heat produced, he found that to raise one pound of water one degree in temperature required the exercise of a mechanical force capable of raising about seven hundred and seventy pounds one foot within a certain time. This simple experiment appears to have directed his thoughts into a new channel, and in the same year he read before the British Association a paper on the "Mechanical Value of Heat," in which the experiment was described. The paper excited the greatest interest, together with much criticism, if not ridicule, but the experiment was repeated by other observers all over the civilized world with the same result, and thirty-five years later, Joule himself, after determining the mechanical coefficient of heat in scores of different ways, showed the accuracy of his crude original work by announcing, as the result of his subsequent investigations, that the exact mechanical equivalent of the heat required to raise one pound of water, weighed *in vacuo*, from the sixtieth to the sixty-first degree Fahrenheit, is seven hundred and seventy-two and fifty-five one-hundredths foot-pounds at the sea-level and in the latitude of Greenwich.

THE Congress of Climatology, which was held in Paris in connection with the Exposition, seems to have been interesting and important. About two hundred members were present, including the President of the French Meteorological Society, M. Renou, who was elected President of the Congress, and many other distinguished experts, representing fourteen countries. One of the best observers of them all appears to have been M. Youji Wada, a delegate of the Japanese Government, who spoke of the hot springs of Japan, and asked the Congress to explain why it was that before a cyclone the temperature of the water in the hot springs rose, while the evaporation diminished. No one was able to suggest a solution of this problem, or of another one, propounded by the same delegate, in regard to the influence of the discharge of smoke from volcanoes. Curiously enough, this convention of climatologists, including distinguished physicians from many of the most renowned health resorts, was nearly unanimous in ascribing very little virtue to the climate of such resorts, and, still more curiously, there was a diversity of opinion as to what qualities of climate would be favorable to invalids, provided they could be secured with certainty. Dr. Labat has found in the Isle of Bute, on the coast of Scotland, in the latitude of Labrador, "vegetation very similar to that of the south of France," while "at Nice would be experienced one of the worst climates of the world," and he considered that the real secret of the good effect of a change of air consisted in "the choice of the house where the patient lived," and "the hours and the place where he took exercise." Dr. Chiais, of Mentone, supported this theory, and believed that if delicate persons, staying in the Riviera for their health, would be more careful about their habitations, and the way in which they spent their time, many lives might be saved. He had found that during the winter, particularly in January and February, there were atmospheric perturbations on the Mediterranean coast, which were accompanied by a great increase of dryness in the air; and these perturbations were "always followed" by "an increase of illness, and dangerous symptoms." For this reason he thought that patients should study the hygrometer, and, on the approach of dry weather, should keep within doors until a change took place, using some means to evaporate water in their rooms, to supply the deficiency of moisture in the air.

THIS observation, which is the more remarkable as contradicting nearly all our received notions as to the beneficial influence of dry air in consumptive cases, and in checking the diffusion of contagion and malaria, seems to have met with the approval of the Congress, although it was agreed, in another part of the discussion, that in the treatment of consumption the most favorable climate was a sunny one, free from dampness and wind, such as is found in many mountain resorts; and that, if these conditions were fulfilled, a low temperature was in many cases not injurious. Before adjourning, the Congress made the sensible suggestion that the professed health resorts were often so badly drained and policed, as to injure, rather than benefit, the persons who came to them. Dr. de Valcour, of Cannes, said that if it had not been for the pertinacity of the English visitors, no sanitary improvement would ever have been made in that town; and it was voted that in France sanitary legislation was desirable, to compel hotel-owners to adopt the measures necessary to avoid poisoning their guests with noxious effluvia.

THE CINCINNATI EXHIBITION.



Monument to Beethoven, Vienna, Austria.

WHEREVER they are shown, the works of three draughtsmen demand and receive instant attention, and the recognition due to skill of marked excellence. Dissimilar in many respects the drawings of Arthur Truscott, H. P. Kirby and Harvey Ellis are alike in impressing the observer with the feeling that the drawings are not labored over nor yet "dashed off," but are put-in with perfect certainty and the assurance that each line will do its work and no more, and that if the line is not there the drawing will lack something of its perfection. Of the three, Mr. Truscott uses the sweetest and purest line, and in telling his story by the mere outline he is excelled by few men; but he often seems impatient with his work, and when it is intended to be sketchy, his drawing often seems to be merely incomplete, and is by so much exasperating. Mr. Kirby's drawings are always satisfying in their boldness and virility, and when there is added to these qualities the interest that usually lies in his designs, the visitor to an exhibition where his drawings are hung finds it difficult to move away from the wall which they decorate. It is generally supposed that these large and free "bits" are mere phantasies concocted in an idle moment, and worked up solely in perspective, but it is often the case that they are the perspectives after carefully-studied working-drawings which have been conscientiously worked out, for practice or for actual use. This was the case with the large drawing of a cathedral apse [No. 232], a study for the design submitted in the competition for the Cathedral of St. John the Divine by the firm of which he is a member, and the same may be said of No. 233, a "Study for a Hotel in Colorado." It was particularly pleasing to see this drawing, for it seemed a token that, at last, Mr. Kirby was to have a chance to worthily carry into execution some of his architectural ideas which he has been obliged hitherto to bring forward merely as studies.

The third of the men, whose work we bring into conjunction, might be traced in his wanderings from office to office by the curious way in which the designs in that office differ during his stay there from what had thitherto been the style and fashion of the work there done. Like the others of the trio, he is a designer of considerable ability and of unquestionable ingenuity, though one always feels like asking if the building shown is really intended to be built. With all his originality, and there are few of his designs which do not show this, one cannot help the feeling that it is, in spite of its strength and boldness, the architecture of a painter rather than of an architect, and the handling of his drawing shows the method of an artist rather than of an architectural draughtsman. If we felt inclined to rank above the work of these men drawings made by any one else in the country, they would be those signed by Francis H. Bacon, whose work — only one specimen of which was shown — for delicate straightforwardness of interpretation it is difficult to surpass.

When the drawings of such men as these, together with those of D. A. Gregg and E. E. Deane, cover, perhaps, one-twentieth of the wall-space devoted to black-and-white work at a large exhibition of architectural drawing, it is easy to see that with such a leavening the exhibition at Cincinnati would be interesting enough even if the balance of the exhibits were of merely mediocre merit, but when the balance of the exhibits are not mediocre at all, but most of them are of enough merit to make an interesting exhibition by themselves, it may be understood that the large showing that the industry and perseverance of the Cincinnati Architectural Club brought together was an unusually attractive and successful affair. [It should be explained here that the reason we said last week that five hundred drawings only were hung was that through a blunder of the binder some three or four hundred entries were omitted from the catalogues first served out.]

The exhibit of the Chicago Architectural Sketch-Club would, by itself, have made another most attractive show, and the contribution from Boston would have made another one, while, from the remainder of the room, could have been culled enough for a fourth, so that if the management had only thought of this device and had charged a quarter of a dollar admission-fee to each of the four groups, no one would have felt that he was being asked to pay too much for his treat.

The peculiarity of the Chicago exhibit was that it consisted almost wholly of water-colors, for out of perhaps one hundred numbers certainly two-thirds were water-colors, and of these water-colors, perhaps one-third were of as high excellence as, with two or three exceptions, any water-colors in the room. One peculiarity was that almost all of these water-colorists, judging from their surnames, are Germans, only one of them bearing an unmistakably domestic name: the work of this gentleman, Mr. W. G. Williamson, was of very even average excellence, and his contributions formed nearly one-fifth of the exhibit. It would be easy enough to name several of these sketches in color which were the least deserving of notice, but not so easy to select those which should be particularized as better than their fellows. Still, without stopping to give reasons for the choice we will name as specially pleasing: "A Ruin of an Old Beer Vault" [No. 183], by F. L. Linden; "Jones Island," a nice little marine view with several sloops lying at anchor in a group, with sails just lowered, by T. O. Fraenkel; an "Italian Garden" [No. 103], by R. E. Schmidt, and a "Creole Mansion" [No. 107], by the same hand — in these two the handling was more architectural than in most of their companions; a "Color Scheme for an Interior," by J. Beckman [No. 145], which was quite perfect in its combination of shades of fawn-color; and a very lightly-rendered sketch, very attractive for its luminosity, "A Suburban Residence, Havana, Cuba" [No. 196], by F. L. Linden.

There were some water-color drawings in other parts of the room which surpassed by far even the best of the Chicago work, and of these, easily the first in real merit stood Mr. Peabody's frame of delicate sketches of three stone country churches which had more of the poetry of artistic feeling in them than anything else in the room; we do not remember to have seen them before or any other examples of his work that were quite so good. At the very opposite end of the scale — and a careful watching of the beam of the balance could not make us feel that the weight of merit deflected the balance in favor of one or the other of the drawings — was No. 671, "A Brick Kiln," by A. Van Briggle, an artist employed at the Rockwood Pottery: strong, vigorous, intense, with the sombre tints touched-in with boldness and precision it made a very impressive drawing.

Quite properly, the special exhibit of Miss M. Louise McLaughlin was hung near the drawings of Mr. Briggle, whom we assume to be, in some sense, her coadjutor in the production of the ceramic work which has made Cincinnati famous. This exhibit of Miss McLaughlin's was one of the most interesting in the room, and shows her as a good all-round artist in water-color, oil, with the etching needle and in decorative copper etching, but it lacked completeness in that no specimens of her work in pottery were painting shown.

In the same alcove were shown some of the colored sketches of the late J. S. Trowbridge, which, taken in connection with his architectural drawings shown with the contributions of the Cincinnati architects, only confirmed our belief that his early death was a very serious loss to his native city and to the profession of which he promised to become a highly valued member.

The Boston contribution was the most judiciously selected and representative, and if it had been entered in the competition for the medal to be given to the best club exhibit — as we believe it was not — it would probably receive the award; as it is we should suppose the medal would go to Chicago in spite of its generally non-architectural character.

The exhibit of the T-Square Club of Philadelphia was, architecturally considered, perhaps better than any, and any exhibit that contained the work of Mr. Truscott and Mr. Eyre would be sure to attract attention in spite of the average of merit being reduced by the contributions of less masterly hands; but it was, apparently, hastily gathered and gave an impression of general dinginess. It was very interesting, however, as it showed that the younger men there are making a serious effort to overcome the evil which at present makes much of the architecture of Philadelphia a by-word and a reproach. Of recent years the aim of Philadelphian architects seems to have been centred on achieving, first of all, eccentricity at the sacrifice of everything else. It is not possible to find in any other city more grotesque specimens of architectural design, in grouping, in combination of parts, in proportion, to say nothing of the utter disregard of the grammar of ornamentation than can be found to-day in Philadelphia. Excellent work there is there, but there is so much that is not excellent in the new work that it overpowers its more praiseworthy fellows. So it is very consolatory to find the members of the T-Square Club aiming to achieve in their work something better than mere eccentricity.

The Detroit exhibit though small was select, and for this reason, as Boston was out of the race, we should incline to give it the second place. Rochester's exhibit was very business-like and of very even merit throughout.

The drawings from St. Paul, St. Louis and Cincinnati did not

rank with the work of the other clubs, although each contained some interesting drawings, but the Cincinnati boys have achieved honor enough in having accomplished so successful an exhibition.

New York draughtsmen were practically unrepresented, perhaps because of the near approach of the Architectural League's exhibition; but it is only what we are getting to expect from New York — an utter indifference to what other people are doing on the assumption that it is impossible to find time to do more than to care for New York's own needs. This would be reasonable enough if New York were found ready to take care of her own needs promptly and efficiently, to put up her pedestals, erect her monuments and start her World's Fair in an energetic and business-like way, without clamor, delay and words.

The exhibition was particularly interesting, in that it was essentially a draughtsmen's show, and was not swamped by drawings of practising architects as might easily have been the case, for the Cincinnati Architectural Club did not feel at liberty to reject anything that was offered, but hung all that came in, and what came was just a fit. Considering, too, that only two days were allowed to clear away the relics of a horticultural show and hang the drawings, the hanging was unexpectedly successful.

There was, outside of the few studies in interior decoration included in the Chicago exhibit, little work of the kind contributed by architects and not much by any one else; but easily, the most interesting drawing of the kind was one showing three figures in outline, by Mr. Charles R. Lamb. In the same connection may be mentioned several pieces of stained-glass, exhibited by Vollmer & Tomoor, of Cincinnati, which served a good purpose.

The reception which the Cincinnati Sketch-Club, assisted by the ladies and citizens of the place extended to the visiting architects, deserves a word by itself, although it differed only slightly from similar occasions.

After the assembly had gathered, Mr. G. W. Rapp introduced General Samuel F. Hunt, who formally welcomed the visitors, and as he had travelled widely and had given careful consideration to the buildings he encountered and their history, he was able to speak easily in a vein which most laymen find it difficult to adopt. Apparently, the slip of the tongue which caused him to assign to Minerva's cranium the honor of being the womb in which the great Jupiter was generated — instead of reversing the situation as fable usually has it — escaped notice, for it was not followed by the laughter which next day greeted Mr. R. M. Hunt when he was guilty of a similar *lapsus linguæ* in introducing as the "Mayor of Buffalo" the gentleman who fills the mayorial chair of Cincinnati, and who was about to read an address of welcome to the visitors.

After Mr. Hunt's address, and just as on such occasions Thalia follows Clio with her offerings, Mr. J. W. Root, of Chicago, stepped forward and intimated that the proprieties would not be properly observed unless poetry followed prose, and he, therefore, begged to read the following:

[C]ODE

FOR THE GUIDANCE OF PERSONS PRACTISING THE PROFESSION OF ARCHITECTURE IN THE UNITED STATES:

This code is promulgated primarily for the instruction of members of the American Association of Architects, but since this body, with its large membership and influence, has become so largely representative of the continent, it is hoped that the code will be followed elsewhere.

The code divides itself into three general sections, each of which embraces three articles.

Section 1 relates to conditions of membership.
Section 2 to rules of practice.
Section 3 to relations between members.

Under the first section are the following articles:

1. Definition of the term architect.
2. Form of application for membership to the Institute.
3. Form of election of the applicant.

The second section embraces the following three articles:

1. The relations of the architect to his clients.
2. His relation to his contractors.
3. His relation to his draughtsmen.

Under the third section come articles touching:

1. Competitions.
2. Unconscious assimilation.
3. Confraternity.

Section 1. An architect is a person who is either addicted to the habitual or occasional making of plans and designs for a house or houses, or who pays at regular or irregular intervals a draughtsman or draughtsmen to make for him the said plans and designs [Explain — Taking such houses as we often see, one would be enough to make its designer (the architect) wish to go off and die. Or again, the architect may make many designs and plans for one house, or he may also build many houses from one design; of course, he does not, but he might.] To return to this article:

But in the latter case (the employment of draughtsmen, etc.) it must be generally known that the architect can read and write, can spell words of one syllable; that he does not say "cornish" and "archeetrave" (for this is not right).

He must also know which is the business-end of a pair of dividers and of a bow-compass He must not rub out pencil marks with a wet finger, but must use India rubber.

ARTICLE II.

The form of application for membership shall be as follows: I (John Jones), a practising architect, hereby apply for membership in the American Association of Architects. I refer to the three contractors who have executed work under my charge, whose names are herewith given, and whose sworn certificates of my general good intent are inclosed. I also inclose perspective drawings of three buildings which I designed.

ARTICLE III.

Upon receipt of this application the board of directors shall inquire, first, if he knows or has given his true name; second, how often he has been "seen" by the contractors mentioned, and what is their experience as to the cash value of his certificates. They shall carefully examine the perspective drawings submitted, if they prove to be made from a building commonly accredited to some other architect, then if they fail to find in all or one of the designs submitted any variation from such original, they shall request the applicant in writing to point out to the board what variations there may be, and if any variations do exist they shall by ballot elect the applicant to full membership.

Section 2 — Rules of Practice.

ARTICLE I.

Relations of Architects to Clients.

It is the architect's duty to suitably impress his client. He must therefore tell what he has done, and if within five years of the time he has been employed as draughtsman for another architect, he should claim as his own all the best work of his late employer. He should advise his client that nothing but the latest style of architecture should be used in building his house. He should also congratulate the client that he did not go to architects like Jones or Smith who pretend to design houses in the latest style, but whose designs are marked at once by ignorance, vulgarity and utter impracticability. Lament the decadence in the present of that refinement in design which to you is so essential.

Promise your client that you will yourself visit his house twice per day during its construction, and will employ as a clerk-of-the-works a competent superintendent at a salary of $3,000 per annum. Give him a round tower on the corner, an ingle-nook, a stair balcony and a copper bay.

ARTICLE II.

As to contractors.

Be firm and severe with them. Remember, however, what a blighting thing it is to lose faith in the inherent goodness of human nature. Ask the contractor, on a Tuesday, if on the preceding week he fully complied with a clause of the specifications touching a part of the work now concealed.

If he says "yes," believe him; if he says "no," reprove him gently and ask if the omission was not more because of forgetfulness than of malice.

Never accept money or commissions from a contractor unless you know him to be perfectly honest and disinterested or unless he assures you that he offers the money because he loves you, and not with the desire to take advantage of you.

ARTICLE III.

As to draughtsmen. Be friendly, even jocose with him, and remember that if he have a truly artistic nature he will be above care for vulgar questions as to more or less salary or its more or less prompt payment.

Make him see all the fussy old womanish clients who bore you to death.

Give him a rough sketch which looks to him like an incoherent freak of nature, and when he has "rendered" it, say you can't understand why he cannot catch the spirit of the original and that you don't know where the profession is going to on account of the ignorance of the draughtsmen.

Give him work enough for three days and tell him you want it next afternoon.

Five years after he has left your office and has made a brilliant success for himself, always refer to him as "a pupil of mine."

Section 3. Relation between members.

ARTICLE I. — COMPETITIONS.

When you compete, compete, remembering that all's fair in love and war.

The essence of a competition should be commissions, and your charges for your services, should your designs be accepted, should be plainly set forth. Always "see" the person on committee having the competition in charge, especially about the time plans are opened.

Be careful *not* to overestimate the cost of the proposed building.

ARTICLE II.

Assimilation is all right, if unconscious.

When an architect has designed and erected a building, the design becomes public property. And as it rarely happens that a design is so good that it cannot be bettered, it is right that its betterment should be undertaken.

If the original designer weighed 300 pounds (intellectually) and his follower — less, so much more reason for the attempted improvement, since the effort will throw upon the general subject of strains a most interesting light.

ARTICLE III. — CONFRATERNITY.

Love your neighbor as yourself, but bear in mind that architects are rarely neighbors. Always speak well of each other. A pleasant word will always charm, such as "Oh! he does no designing himself, his draughtsmen do that; or, He got that job for two per cent; or, Before I'll stoop to such means to get work I'll go shoemaking."

Such things warm your own heart and help to keep active all the gentler amenities of the profession.

As no one else had anything grave or humorous to say, the meeting shortly after dispersed.

THE AWARD OF MEDALS.

THE committee appointed to award the medals offered by certain citizens of Cincinnati for drawings shown at the exhibition have discharged their work, by assigning to the T-Square Club of Philadelphia the gold medal offered by A. Howard Hinkle, Esq., for the best club exhibit;

To Mr. C. H. Blackall, of Boston, the silver medal for the best work exhibited by an individual club-member;

To Mr. C. Howard Walker, of Boston, the medal offered by the Builders' Exchange for the best perspective drawing in water-color;

To Mr. A. H. Ross, of New York, the special gold medal offered for the best free-hand drawing made by a draughtsman under twenty-one years of age.

The silver medal offered by the Wayne Hardware Company, of Cincinnati, for the best drawings of a set of door hardware, was not awarded, probably because, owing to the late day at which the offer was made, only two draughtsmen found time to prepare the required drawings. The failure to make this award seems hardly fair, the more that the Hardware Company, when it found that only two designs had been submitted, declared its willingness to give medals to each contestant.

THE CONVENTION AT CINCINNATI.

"MR. President, I move you, sir, that we fix the dues at fifteen dollars per annum, and return five of them to every member who attends the annual convention." The manner in which this proposition was received by the newly-reorganized American Institute of Architects when Mr. McNamarra, of St. Louis, put it forward as a harmonizer of conflicting views on this important topic was quite typical of the proceedings of the Convention throughout. First came a burst of hearty laughter and then a vote which was nearly large enough to carry it, but yet showed that the more steady-headed members still had the control of things.

It was particularly fortunate that there were so many men in attendance who had an earnest purpose to carry through the formalities of the consolidation, even if now and then a phase presented itself which was somewhat unpalatable to the more impetuous of the younger men, for on one or two occasions it looked for a moment as if the bark that had been guided in safety nearly through the riffle of the rapids would, after all, be capsized, even if it were not finally swamped. A less impetuous man than Mr. Hunt would have been a safer presiding officer for an occasion where there were such obvious possibilities of clashing, but good sense on one side and on the other prevented at all times more than the merest hint at the possibility of danger.

The only point at which there promised to be a serious hitch occurred in the first morning session, when it was moved that the members of the Western Association of Architects, attested by their secretary as being in good standing, should be *admitted* into the American Institute of Architects. The motion was made in entire good faith, but it at once produced a protest from the members of the Western Association of Architects, who declared that they objected to being "admitted," for they had understood that the members of each body were to enter on their new relations arm-in-arm, as it were. Various suggestions were made by one member and another, for every one realized that the difficulty was merely a verbal one, but still no one could succeed in phrasing it so as to suit the necessities of the occasion and the wishes of the members of the then unaffiliated societies. Mr. Hunt at length found a chance to explain that he thought that it would be necessary to adopt essentially the phraseology of the first motion, for the reason that he had a shrewd suspicion that unless the Western members were admitted into the old American Institute of Architects, the other method of coalition, whatever one might be adopted, would bring about the abrogation of the charter of the American Institute of Architects, which it was very desirable to have preserved. Before there was opportunity to continue the discussion, the committee of entertainment interjected an announcement that luncheon was ready, and the meeting was adjourned, to meet in the evening. This was a fortunate fortuity, as it gave members — that is, the few who were disposed to consider the matter of "admittance" in the light of a pill which it was desirable not to swallow — opportunity to realize that it was only a verbal difficulty, and that all that the mover of the motion and his supporters desired was that the consolidation should be effectively and legally brought about. It also gave members of the Western Association of Architects who were disposed to pooh-pooh at the value of the charter of the American Institute of Architects a chance to realize that, though the Institute had no real estate or other property of much value to safeguard, it did have a most valuable property in that it was recognized by the courts as the properly-chartered representative of the architectural profession, and that it would be unwise in the last degree to jeopardize this slight protection that architects have in the contests into which they are drawn by asking the courts to look with as much respect on a body chartered in 1889 as upon one which had acted effectively under a charter for thirty-two years.

The morning session thus brought to a close had been of the most harlequin complexion, and at a given moment it is extremely doubtful if the members in attendance, particularly the members of the Western Association of Architects, knew in what capacity they were acting: whether as members of the Western Association of Architects, as members of a joint Convention, or, towards the last, as members of the new organization. The convolutions and involutions of the proceedings were so difficult to follow that it is not surprising that they were followed by revolutions at the next session, when it became clear that it was necessary to undo some of the things which were supposed to have been done properly in the morning.

MORNING SESSION, NOV. 20.

The first session was opened by the President of the Western Association of Architects calling that body to order, — which was effected without calling out of order the members of the Institute there present. There were about 140 persons in the room, including the reporters, so that it was uncomfortably full, and this led to the subsequent meetings being held in a larger room, which the Cincinnati Chamber of Commerce very kindly placed at the disposal of the Convention.

After the reading of the annual address by Mr. Carlin and the calling of the roll by the Secretary, the Association was proceeding with its ordinary routine work of listening to the reading of the reports by its committees — and a few actually were read — when it occurred to some clear-headed member that business might be expedited if these reports should be referred to a committee of the to-be-organized Institute, to be subsequently appointed in due course: this was accordingly done, and, as there appeared to be no other business to come before the meeting, the Western Association of Architects was adjourned, and this seemingly essential and simple proceeding made necessary in the evening the revolution spoken of.

Mr. Carlin having vacated the chair, Mr. Hunt assumed it in his turn and called the Institute to order, and then delivered a short and emphatic address. Mr. Bloor then read the report of the Board of Trustees, and the remaining Institute reports were referred, after the manner of the similar Association reports, to the future committee.

The Institute was then adjourned. The meeting was then considered to be a joint Convention, and Mr. Hunt was elected temporary chairman, though by this time people had become so confused that it is doubtful if any one knew whether during the remainder of the session Mr. Hunt was acting as temporary chairman of the joint body or as the President of the American Institute of Architects intent on extending a cordial welcome to those who had not before been under his direction. But before confusion became unbearable the meeting was adjourned to eight o'clock in the evening.

The luncheon provided by the Ohio Association of Architects and enlivened by music was very enjoyable, materially, and gave a desirable opportunity for members to move about and find out who was present, and to assure one another that all that was desired was that the coalition should be effected, even at the sacrifice of the keenest sentimental feelings, which were really non-vital.

THE EXCURSION THROUGH THE SUBURBS.

Taken six weeks earlier in the season, the drive through the suburbs of the city would have been a most enjoyable occupation for the afternoon, even for the Westerner who was probably somewhat familiar with the character of Western river-scenery, while to the Eastern man it afforded, while the light lasted, as full a measure of enjoyment as the leaden, rain-laden sky and smoke-charged atmosphere, the bleak chilliness of the temperature and the condition of the mud-filled roads would allow. The Committee of Arrangements were on this occasion caught napping, as it was found that, imposing as was the array of carriages provided, there were not quite enough, and a delay of half an hour or more was enforced while other equipages were procured. At length, headed by a tally-ho coach and two other four-in-hands, the long line of march was started, to the delight of the Cincinnati small boy, who seemed to follow on with tireless persistence, as his jeering voice sounded from the curbstone all along the route. The impression that the visitor received of the business part of the city was that it consisted of but a single square of not very imposing buildings, amid which cheap lodging-houses and shooting-galleries nestled cheek-by-jowl with more pretentious buildings; that there was a multiplicity of street-cars, propelled by horses, by cable and by electricity; that the Post-office building was one of the most successful pieces of work turned out of the Government office during Mr. Mullet's incumbency; that no citizens lived in the city, but that every one lived in the suburbs, which could be reached only by following the most tortuous and vermicular of paths, which, just after leaving the city streets, wound round amidst the most squalid territory that could possibly surround a large city. The impression made at this part of the drive was one of streets covered with flowing mud, shanties in every degree of decrepitude, and all covered with decaying iron-roofing — which made one understand that the conductors of the expedition could not be interested in advertising the advantages of this useful commodity — perched on the sides and at the tops of high banks separated from one another by wide and deep gullies, all wet, disordered, untidy, miserable. But when the suburbs proper were at length reached then the object of the drive was easily understood. What, nearer town, were torn and dishevelled gullies here were carefully-tended banks and lawns, offering, with the groups of walnut and other trees, settings than which an architect could desire no more inspirating. The pace

at which the long procession moved was rapid enough to prevent more than fleeting glances at the buildings, but these glances showed that the employment of stone for a building material — for stone is used almost exclusively in the neighborhod — led to architects seeking a more truly architectural treatment than where shingles are the mainstay. The resulting buildings are, of course, of varied merit, though the average is fairly high. A stop was made at the house of Hon. W. S. Groesbeck, built about twenty years ago by Mr. McLaughlin, the owner hospitably opening it for inspection in spite of the inclemency of the weather. Another house was to have been visited, but the lateness of the hour forbade a stop, and the same inconvenience stood in the way of the enjoyment of the last half of the ride, particularly that part which touched on the large public park near Avondale.

EVENING SESSION.

When the evening session was called to order, Mr. Hunt stated that he had submitted the question of the preservation of the Institute charter to the best legal talent of the city, and thereupon read an opinion under five heads given by Judge J. D. Cox, which made it patent to every one in the room that the members of the Western Association of Architects must consent to be "admitted" into the Institute. The discussion that followed developed the fact that in the morning the Western Association of Architects had adjourned simply, and that unless its dissolution were accomplished in some more effective way it would still continue to exist, a wheel within a wheel, a condition of things most undesirable. As it was yet in existence, this body was still capable of action, and that it might act the general meeting was adjourned for five minutes. Mr. Carlin took the chair, and once more called the Western Association of Architects to order. Naturally, members tried to take advantage of the opportunity to do some forgotten things of slight importance, but the five minutes were too short to allow of this, and the time was even too short to find a way of dissolving the Association without making it absolutely necessary to do over again every single act from the beginning of the meetings. Finally, it was perceived that the only practicable way was to instruct the Secretary to correct his minutes of the morning session by inserting the words "*sine die*" after the word "adjourn"; he was also instructed to take any legal steps that might be necessary for surrendering the charter and transferring the property of the Western Association of Architects to the Institute. After this the supplementary meeting was adjourned — also *sine die* — and the Institute was once more called to order.

It was then discovered that under the provisions of the original Institute constitution, as well as under the provisions contained in the new constitution and by-laws prepared by the Committtee on Consolidation and already adopted, it was not possible at this convention to discuss and amend the regulations there laid down. This was a great surprise and disappointment to almost all present, for it was generally believed that the most important object of the convention, after the act of consolidation had been consummated, was to discuss and amend the proposed regulations. But it was not to be, and the members who had come prepared to kick against one clause or another, found themselves compelled to reserve their rhetoric for the next convention. Probably nothing did so much to preserve the general tone of good-natured harmony than the shutting off of such discussion.

The remainder of the brief session was occupied with the passing of votes of thanks to the Cincinnati Architectural Sketch-Club, the Ohio Association of Architects, the Mayor and the City of Cincinnati, the gentlemen who had opened their houses for inspection and to the Chamber of Commerce.

Committees were then appointed by the President to fix the amount of annual dues; to fix the place of holding the next annual convention, and two nominating-committees to prepare each a ticket of officers for the ensuing year.

Mr. Stone, of Providence, offered as an amendment to the constitution, to be considered next year, that Fellows after reaching the age of seventy should, provided they had been for ten years in good standing in the Institute, be exempted from the further payment of dues.

Just before the meeting adjourned a telegram was received from the Ontario Association of Architects congratulating the American Institute of Architects and the Western Association of Architects on the step they were taking, and wishing the members might derive all the hoped-for benefit when the Act was consummated.

MORNING SESSION, THURSDAY, NOV. 21.

The first act on reconvening on Thursday morning was the report of the Committee on Dues, and these, Mr. Gibson, of New York, as chairman, reported the committee had thought best to fix at ten dollars per annum. The report met with objections from both sides, and for opposite reasons: the Association members had paid but five dollars per year, and, though they were willing to pay ten, they did not care to pay twenty-five dollars, the former Institute due, and the sum which the old Institute members thought would be none too large if, as was desirable, the secretary and treasurer should be paid for their services. The discussion which followed brought many men to their feet, but the decisive argument was the fact that the Association had always paid its way on an assessment of five dollars, and a much larger body ought to be able to do as well with double the relative income at command. As already stated, Mr. McNamara's motion to compromise on fifteen dollars was lost by a narrow margin, and the dues for the ensuing year are fixed at ten dollars.

The committee on the selecting of a site for the next convention reported in favor of Washington. An effort to substitute New York miscarried, and the next convention will be held at Washington.

The nominating-committees then reported their tickets as shown on the printed slips, and were instructed to distribute them. While this was being done Mr. Carlin asked leave to read a letter from Mr. Dankmar Adler, of Chicago, and, on receiving permission, began to read, Mr. Hunt rising as usual to listen. The letter opened in the usual way with expression of regret that he was unable to attend the meeting, but asked Mr. Carlin, in his behalf, to place in nomination for the presidency of the reconstructed Institute, Richard M. Hunt, of New York, concerning whose fitness for the office Mr. Adler wrote with such grace, enthusiasm and justice that the reading was interrupted by a burst of applause. When the unfortunate chairman found what the letter really contained, he was unable to maintain a demeanor of official attention, but sought what privacy he could find by sinking into his chair and covering his averted face with his hands, while the members sought to cover his agitation by prolonging their applause. Mr. Carlin then said that as Mr. Hunt's name headed both the tickets, he moved that Mr. Hunt be elected president by acclamation. The motion being seconded, the Secretary put it to vote, and the president was so elected. When the applause had died away Mr. Hunt rose to his feet to make the customary acknowledgment, but all that his agitation would allow him to say was: "Gentlemen, that letter takes my breath away," and those who listened to his half-stifled voice knew that he was not exaggerating its effect upon him.

As the tickets placed in nomination for the secretaryship Mr. J. W. Root, of Chicago, and Mr. E. I. Nickerson, of Providence. Mr. Carlin asked, in Mr. Adler's behalf, to nominate to the position Mr. A. J. Bloor, of New York, and he then read an additional paragraph from Mr. Adler's letter which expressed the belief that no man had labored in behalf of the profession so long, unselfishly and so effectively as Mr. Bloor. This nomination was seconded, with applause. The ballots were then cast, and while the tellers were counting them Mr. J. W. Yost, of Columbus, read a paper on "Professional Conquest," which, thanks to the poor acoustic properties of the room, was inaudible to most in the room, and the members finding they could not hear made the matter worse by breaking into conversation on all sides.

The meeting then adjourned for lunch.

AFTERNOON SESSION.

On the reassembling of the convention, the first business was the reading of the result of the ballot, from which it appeared that the only tie-vote was for the place of Second Vice-president, for which office Mr. J. W. McLaughlin, of Cincinnati, and Mr. H. Van Brunt, of Kansas City, had received an equal number of votes. A second ballot secured the place for Mr. McLaughlin, and, fortunately, Mr. Van Brunt was elected to a three years' directorship through Mr. McLaughlin's having been elected to that place also, since his name appeared on both tickets, but in different capacities.

The list of officers thus elected is as follows:

President, Richard M. Hunt, of New York; *First Vice-president*, W. W. Carlin, of Buffalo; *Second Vice-president*, J. W. McLaughlin, of Cincinnati; *Secretary*, John W. Root, of Chicago; *Treasurer*, S. A. Treat, of Chicago.

Directors for three years: Edward H. Kendall, of New York; Chas. A. Cummings, of Boston; Dankmar Adler, of Chicago; Henry Van Brunt, of Kansas City; Jas. G. Cutler, of Rochester; C. E. Illsley, of St. Louis; E. T. Littell, of New York; Jas. H. Windrim, of Philadelphia.

Directors for two years: R. S. Peabody, of Boston; R. W. Gibson, of New York; W. W. Clay, of Chicago; Stanford White, of New York; C. A. Coolidge, of Boston; W. H. Hayes, of Minneapolis; O. P. Hatfield, of New York; W. R. Briggs, of Bridgeport.

Directors for one year: T. P. Chandler, of Philadelphia; Adolf Cluss, of Washington; J. C. Stevens, of Portland; C. F. Schweinfurth, of Cleveland; Sidney Smith, of Omaha; G. W. Lloyd, of Detroit; W. C. Smith, of Nashville; A. C. Bruce, of Atlanta.

Mr. Bloor received a complimentary vote of twenty-two for the office of Secretary, and the convention also offered to him and to Mr. Hatfield votes of thanks for the faithful and disinterested manner in which they had so long discharged the duties of Secretary and Treasurer of the original Institute.

The committee, which had had in charge the consideration of the important question of the employment of a clerk-of-works, was continued and enlarged, and instructed to report at the next convention.

A new committee was appointed to consider how the members of State Associations and Chapters, who were not already members of the Institute, might become so with as little delay as possible. A committee on professional ethics was also appointed.

As no other business offered at the moment, Mr. Glenn Brown, of Washington, read a paper on the evaporation of trap-seals, which was quite inaudible to most persons in the room.

Mr. McNamarra of St. Louis then followed with an interesting — the more that it was quite audible — paper on domes and towers.

The Secretary was then instructed to prepare and distribute to such journals as he might select, such synopsis of the proceedings as was desirable to place before the profession in advance of the publication of the annual "*Proceedings.*" A member suggested that this was hardly necessary, inasmuch as several professional journals were represented at the convention by reporters, and they would probably publish at once full reports of the proceedings. This, however, seemed hardly to be satisfactory to some of the members, and the instructions were unchanged.

The question of publication having been broached, Mr. Gibson, of New York, said that inasmuch as the *American Architect* had always been the official journal of the American Institute of Architects for purposes of publication, he would suggest that this connection be continued. As the suggestion at once brought out a protest from different parts of the room, and it so appeared that the members did not care to discriminate for or against any of the architectural journals now published, the suggestion was withdrawn.

During the discussion of the question of annual dues, considerable stress was laid on the injustice of expecting unpaid officials to incur the expenses of attending the necessary directors' meetings and the annual conventions, and it was the hope of those who urged the larger annual due that in this way might be obtained a sum which could be drawn on for a part of, if not all, these burdensome expenses. [The matter of lightening the expenses of the Executive Committee was, we believe, left to the discretion of the directors]. At this stage of proceedings the same matter came up in broader fashion in the shape of a proposition that it should be part of the directors' duties to consider and report whether it were not feasible to devise a practicable method by which the expenses of the members attending the convention might be equalized. As this is an obviously simple thing to accomplish by computing the mileage of those who signify their intention of attending and then assessing the amount equally on all such members, it may be hoped that a step will soon be taken which will make these annual meetings larger and more really representative of the whole country. A delegation could under such conditions afford to come from San Francisco even, while the Eastern men would not be materially affected by the small addition to their own individual expenses. It was, really, of all the suggestions made during the entire convention, the one best worth the making.

Letters were read from the Mayor, Board of Trade, architects and other bodies in Denver inviting the Institute to hold its next convention in that city, but the invitation, as the site was already decided on, was declined with thanks.

The last important act of the meeting was taken by Mr. Brown, of Washington, who offered as an amendment to the constitution, to be acted on next year, a resolution that each Chapter of the Institute might send to the annual convention a member or delegation entitled to cast a vote on all questions equal in amount to the full membership of such Chapter. In other words, the matter of representation by proxy, which we have advocated, is now properly brought before the Institute for consideration, and when one looks back on the business which was actually transacted during the convention, it is discovered that the greater part of the business either was actually done or could have been as well done by small committees whose action would naturally give much more satisfaction if it were taken with the advice and consent of their fellows, who had delegated to them full power to act, than ever can the action of individual members, whose presence on a committee hinges on the accident of their happening to be at a convention, where the president's eye chances to fall upon them.

After this as no further business offered the convention adjourned, subject to the call of the directors.

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF A. W. NICKERSON, ESQ., DEDHAM, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Helio-chrome, issued only with the Imperial Edition.]

THE HOME BUILDINGS ON THE BARDWOLD PROPERTY OF MRS. A. W. BAIRD, MERION, PHILADELPHIA, PA. MR. BENJAMIN LINFOOT, ARCHITECT, PHILADELPHIA, PA.

THIS group of buildings comprises both garden and stable offices, each with an enclosed yard separate and distinct from the other; the first has tropical, rose and greenhouses, graperies, pottery-sheds and gardeners' sitting and sleeping rooms also a workshop with a pigeon-loft over, and underneath the carriage-house a large cellar for the storage of winter vegetables: the stable portion embraces harness-rooms, men's sitting and sleeping rooms, coach-house with carriage-loft over reached by a carriage-hoist, and single and box stalls with an isolated "hospital box;" the hay and feed shoots are placed in an annex shut off by doors from the stable. The exterior is built of light stone up to the square, and the gables and yard walls with brown brick finished with brown terra-cotta copings and finials, the whole of the interior is faced with red pressed brick; floors laid with asphaltum and the yards paved with asphaltum blocks. The total cost including a large underground rain-water cistern holding forty thousand gallons of water, hot-water heating apparatus, pumps and elevated tanks was $52,000.

THE THOMAS JEFFERSON ASSOCIATION BUILDING, BROOKLYN, N. Y. MR. FRANK FREEMAN, ARCHITECT, NEW YORK, N. Y.

THE building is built of stone, terra-cotta and moulded brick, Spanish tile roof. The building is now about up to the first-story beams. The basement will be used as a restaurant; the first story has a large hall with a gallery for public meetings. The remainder of the building will be used for offices. The entire structure will cost about one hundred and fifty thousand dollars, total cost.

HOUSE FOR MISS E. F. MASON, DUBLIN, N. H. MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS, BOSTON, MASS.

THE first story is of local field-stone and seam-faced ledge-stone, and the chimneys are topped out with the same. The wall is lined on inside with a four-inch brick wall giving a four-inch air-space. The terrace walls are stone and floor of terrace is of brick on edge. The remaining walls and roof are shingled and stained.

SIGMA-PHI CHAPTER-HOUSE, GENEVA, N. Y. MR. THOMAS NOLAN, ARCHITECT, ROCHESTER, N. Y.

COURT-HOUSE, SAVANNAH, GA. MR. W. G. PRESTON, ARCHITECT, BOSTON, MASS.

DESIGNS FOR HARDWARE SUBMITTED IN A COMPETITION OF THE T-SQUARE CLUB BY MR. ARTHUR TRUSCOTT, PHILADELPHIA, PA.

MR. R. M. HUNT'S ADDRESS.

FELLOWS AND ASSOCIATES OF THE A. I. A.:

THIRTY-TWO years ago a few architects convened in the city of New York for the purpose of considering the expediency of organizing a professional society, the object of which, as set forth in the constitution, was to unite in fellowship the architects of this continent and to combine their efforts so as to properly promote the artistic, scientific and practical efficiency of the profession. This resulted in a constitution adopted in February, 1857, and incorporated in March of the same year, as the American Institute of Architects. The continual and rapid growth of the requirements of civilization, the immense distance between the great business centres of the East and West, made it advisable to establish Chapters as integral portions of the Institute, and in order to compensate for these and other difficulties, the federal system of local organizations was adopted in 1867 as the best method of reaching directly the necessities of the profession throughout the country.

To-day, when the Twenty-third Convention of the American Institute of Architects meets at Cincinnati, the full force of the original intention of the founders is impressive with a great significance. The Institute and its younger brother, the Western Association, stretch out their hands in fraternal greeting, as they meet to effect the unification of the two great architectural associations of the United States and to consider the carefully prepared report of the special committee on consolidation, which has been published in advance, that each member present might bring the result of his deliberations to bear upon the discussion of the best method to accomplish the end in view.

The Institute depends upon the Chapters for its very life blood, and could not exist any more than the body without its members, if the Chapters were not alive and active. Chapters should therefore be strong in membership and earnest in work, perfecting every suggestion for the advancement of the profession, considering and furthering all educational and helpful methods, and bringing to the conventions of the Institute all matters accomplished and under consideration that may be of interest to the profession at large.

The practising architect, from the very diversity of his duties and requirements, gains largely by constant intercourse with his confrères. The interchange of ideas and personal experience are of inestimable benefit to him, and consequently to his clients; in fact, it should be the self-protective duty of every architect to belong to one of the Chapters. I would here suggest that too often young men, fresh from study, in the fire of ambitious enthusiasm, but yet untaught by stern lessons of experience, are eager to establish new leagues, associations, societies and clubs, rather than affiliate with established institutions, and reap the profit of proved effort.

A little reflection would teach them that the older institutions have formulated those rules and regulations, those principles of art and practice, which have elevated the profession in America to its

present honorable standing. That through the insistent and persistent course of the Institute, for the rights, for the dignity, and for the position of architecture as a fine art, so long ignored in this country, they have, through precedents created for them, been spared some fierce contests.

Let them rather profit by the paternal care of the Institute, as their advisor and advocate, stretching forth with the strength and vigor of new inspirations to reach the ideals of its standards, taking for their underlying principle mutual assistance and coöperation in the more familiar intercourse of the Chapters.

The report of the Special Committee on Consolidation is so wisely considered and so admirably expressed that it leaves nothing for me to say, beyond words of commendation, and to impress upon you that the earnest efforts of these gentlemen in thus providing for the merging of the two great architectural associations of our country into a common Institute is not a funeral dirge to "ring out the old, and ring in the new," but a refrain, ancient as history, and strong as truth, "Union is force."

CONSTITUTION OF THE CONSOLIDATED AMERICAN INSTITUTE OF ARCHITECTS AND WESTERN ASSOCIATION OF ARCHITECTS.

ARTICLE I.

The corporate name of this Society shall be The American Institute of Architects.

ARTICLE II.

The objects of this Institute are: To unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession.

ARTICLE III.

Section 1. The Institute shall consist of Fellows, of Corresponding and of Honorary Members.

Sec. 2. The condition of membership as Fellows shall be the honorable practice of the profession of architecture, in accordance with the Constitution and By-Laws of the Institute.

Sec. 3. The status of an architect is hereby defined as follows: An architect is a professional person, whose occupation consists in originating and supplying artistic and scientific data preliminary to and in connection with the construction of buildings, their appurtenances and decorations; in supervising the operations of contracts therefor, and in preparing contracts between the proprietors and contractors thereof.

Sec. 4. No member shall accept direct or indirect compensation for services rendered in the practice of his profession other than the fees received from his client.

ARTICLE IV.

The officers of the Institute shall be as follows: a President, a First and Second Vice-president, a Treasurer, a Secretary and a Board of Directors, consisting of the above-mentioned officers, *ex officio*, and of twenty-four other Fellows of the Institute.

ARTICLE V.

The Institute shall hold an Annual Convention and such other meetings as shall be ordered.

ARTICLE VI.

This Constitution may be altered or amended only upon a two-thirds vote of all the Fellows, ascertained by a letter-ballot on the proposition of the Board of Directors or of an Annual Convention.

BY-LAWS OF THE CONSOLIDATED AMERICAN INSTITUTE OF ARCHITECTS AND WESTERN ASSOCIATION OF ARCHITECTS.

ARTICLE I.—MEMBERSHIP.

Section 1. Fellows shall be practising architects, residing in America, whose professional status shall be demonstrated to comply with the Constitution, and who shall be admitted or elected in the manner hereinafter set forth.

Sec. 2. Candidates for admission to Fellowship shall submit to the Board of Directors, through the Secretary, an application for membership made as follows:

....18

To the Board of Directors of the American Institute of Architects

....

My full name is..

My business address is.......................................

The name of my firm is.......................................

I have practised the profession of architecture for.............. years.

The accompanying photographs, numbered respectively 1, 2 and 3, show completed buildings erected from my plans and under my supervision.

No 1 is a (here give general description of building).

No. 2, Do.

No. 3, Do.

The accompanying drawings are (here enumerate and describe such drawing as the candidate desires to submit). We, Fellows of the American Institute of Architects, hereby indorse Mr....................'s application for Fellowship. We know him personally; we know his work; we believe him to be worthy of membership.

....

....

* All applications of and any further information concerning candidates shall be considered confidential by the Board of Directors, which shall absolutely reject or provisionally accept each application, and shall cause the Secretary to send each Fellow of the Institute the names and addresses of the candidates provisionally accepted, together with those of their endorsers. The Board of Directors shall, at its first session under these By-Laws, formulate and publish rules for the conduct of a letter-ballot by all the Fellows of the Institute, in accordance with which rules the application of each candidate shall be balloted upon. In the case of each candidate, these ballots are to be opened and counted by the Board of Directors at a meeting held not less than thirty days after the above-prescribed notice of such application shall have been sent to each Fellow by the Secretary.

If, upon counting the letter-ballots received, it is found that five or more ballots have been cast against the admission of any candidate, he shall be declared rejected — otherwise he shall be declared duly elected a Fellow of the Institute.

Any rejected candidate may make a new application after the expiration of one year.

Sec. 3. Fellows who have relinquished the practice of the profession, and thereby lost their right to Fellowship of the Institute, also foreign architects, civil engineers and other scientific men, as well as amateurs of distinction, may be elected Corresponding or Honorary members of the Institute at any Annual Convention upon the recommendation of the Board of Directors. Corresponding and Honorary members shall have all the privileges of the Institute, except that of voting and of eligibility to office. The membership of any Honorary or Corresponding member residing on this continent shall cease whenever he engages in the active practice of architecture.

Sec. 4. All resignations shall be made in writing to the Board of Directors, and addressed to the Secretary; but a resignation shall not release the member presenting it from any obligation to the Institute, and all interest in the property of the Institute of members resigning or otherwise ceasing to be members shall be vested in the Institute.

Sec. 5. All questions of discipline shall be acted upon by the Board of Directors, which shall decide absolutely and without recourse any questions of unprofessional conduct, non-payment of dues or action conflicting with the Constitution or By-Laws, and, acting under this By-Law, the Board may pass a vote of censure or drop a name from the roll; but no such action shall be taken until the accused shall have had an opportunity to be heard in his own defence.

ARTICLE II.—MEETINGS.

A Convention of the Institute shall be held annually. The time and place of holding the Convention, when not fixed by the preceding Convention, shall be determined by the Board of Directors. Special meetings of the Institute may be called at any time by the Board of Directors, and shall be called by the Secretary whenever the President or a Vice-president shall have been so requested in writing by not less than fifty Fellows, setting forth the purpose of such meeting. At any such special meeting, no business other than that specified in the call shall be considered except by a three-fourths vote of the Fellows present and voting.

Fifty Fellows shall constitute a quorum for the transaction of ordinary business.

ARTICLE III.—ELECTION OF OFFICERS AND STANDING COMMITTEES.

An election for officers of the Institute, as enumerated in Article 4 of the Constitution, shall be held at each Annual Convention. The election shall be by ballot. A plurality vote shall elect. The officers elected shall enter office on the 1st of January following their election, and shall hold office until their successors qualify.

ARTICLE IV.—PRESIDENT AND VICE-PRESIDENT.

Sec. 1. The President shall be elected at each Annual Convention to serve one year; and he may be re-elected for the next following year, but after serving such second term no President shall be eligible to re-election until two years shall have elapsed. Any Fellow shall be eligible to the office of President.

The President shall preside at all meetings of the Institute and shall be Chairman of the Board of Directors.

Sec. 2. A first and second Vice-president shall be elected at each Annual Convention, to serve for one year; and in a case of the absence of the President or of his inability to act, his duties shall devolve on the Vice-presidents, in the order of precedence.

ARTICLE V.—SECRETARY.

Sec. 1. The Secretary shall be elected at the Annual Convention, to serve for one year.

Sec. 2. The Secretary shall keep a record of the proceedings of the Institute, and of the Board of Directors, and of all matters of which a record shall be deemed advisable by the Institute in convention or by the Board of Directors. The Secretary shall notify the members of their election, shall keep a roll of the members of the Institute, shall issue notices for all meetings of the Institute, and shall conduct its correspondence. He shall also be the keeper of the seal of the Institute.

Sec. 3. The records and the correspondence, except in relation to qualifications of candidates for membership, shall at all reasonable times, be open to the inspection of Fellows of the Institute.

Sec. 4. The Secretary shall be allowed the sum of $1,500 per annum for clerical assistance.

ARTICLE VI.—TREASURER.

Sec. 1. The Treasurer shall be elected at each Annual Convention to serve for one year; he shall collect and, under the direction of the Board of Directors, disburse the funds; he shall keep the accounts of the Institute in books belonging to it, which shall be at all times open to the inspection of the Board of Directors; he shall report at every annual meeting and oftener if required, on the state of the funds.

Sec. 2. The accounts of the Treasurer shall be audited by a committee of three, appointed by the Institute at the first session of each Annual Convention. The committee shall report before the close of the Convention. No member of the Board of Directors shall be an auditor.

Sec. 3. The Treasurer shall have power, with the approval of the

Board of Directors, to employ, at the expense of the Institute, such clerical aid as may be necessary in the discharge of his duties.

ARTICLE VII. — FINANCE.

Sec. 1. The initiation fee of Fellows admitted after the first Convention shall be ten dollars ($10), and shall be paid to the Treasurer within three months of the date of notification to the candidate of his election, in default of which payment the election shall be void.

The annual dues of Fellows shall be as fixed by a majority of the members at the first Annual Convention, payable to the Treasurer in the month of February in each year. [For the year 1889–90 they are $10.00].

Sec. 2. No Fellow who shall be in arrears for dues shall be permitted to vote, or to exercise any of the privileges of membership, and any Fellow who shall be twelve months in arrears shall be subject to a penalty of 20 per cent per annum.

Sec. 3. Fellows elected in any year after August 1, shall pay only one-half of the annual dues for that year.

Sec. 4. Actual travelling expenses and necessary disbursements of the President, Secretary and Treasurer shall be paid by the Treasurer, when audited by the Board of Directors, who shall also have power to approve and audit like expenses and disbursements of committees.

ARTICLE VIII. — BOARD OF DIRECTORS.

Sec. 1. At the first convention of the re-organized Institute there shall be elected twenty-four Directors, of whom eight shall be elected for three years, eight for two years, and eight for one year; at each succeeding Annual Convention eight Directors shall be elected for a term of three years.

No Director whose term of office has expired shall be re-elected for the next ensuing term. This provision does not apply to *ex officio* members of the Board.

Sec. 2. The duties of the Board of Directors shall be as follows: In the interim between Conventions of the Institute, the Directors shall be the custodians and conservators of all the properties and interests of the Institute, and they shall have full power and authority, and it shall be their duty to do all things (within the limitations fixed by the Constitution and By-Laws) which, in their opinion, shall be conducive to the welfare of the Institute.

The Board of Directors shall hold at least two meetings in each year, one within ten days after the beginning of its term of office, and another within thirty days before the regular Annual Convention of the Institute. At the former meeting it shall elect an Excetive Committee and formulate a plan of action for itself and for said committee for the ensuing official year, and at the last-mentioned meeting it shall receive and act upon the reports of officers, of Chapters, and of standing and of special committees, and shall prepare its annual report to the Convention.

Sec. 3. The Board of Directors shall also, at its first meeting, formulate and publish for the information of the Institute such rules and regulations as it may deem expedient and necessary to establish for the furtherance of the discharge of its duties and responsibilities. In these rules and regulations shall be embodied a statement defining its delegation of powers to the Executive Committee and to any other committees that may be appointed by the Board.

ARTICLE IX. — EXECUTIVE COMMITTEE.

The Executive Committee shall consist of seven members, of whom the President, Secretary and Treasurer of the Institute shall be three. The President and Secretary of the Institute shall be, respectively, Chairman and Secretary of the said committee.

ARTICLE X.

The Institute shall encourage the formation and continuance of State and local associations, which shall be known within the Institute as Chapters. These bodies shall continue, and shall be organized under charters from the Institute, which may be granted by the Board of Directors, and which shall clearly define the limits of territory and jurisdiction of the bodies existing or to be formed. The general formation, government, standard of membership and form of election of members in these bodies shall be uniformly prescribed by the Institute, but each body shall have the power to make such further rules and By-Laws as it may deem best, provided that no action shall be taken which shall conflict with the Constitution and By-Laws of the Institute.

ARTICLE XI.

These By-Laws may be amended at any meeting of the Institute by a two-thirds vote of the members present and voting, provided notice of any proposed amendment shall have been sent by the Secretary to each Fellow at least thirty days before the amendment is to be voted upon.

ARTICLE XII.

Sect. 1. Upon consolidation, the Fellows and Associates of the American Institute of Architects and the Fellows of the Western Association of Architects shall become Fellows of the reorganized American Institute of Architects upon their membership being certified to by the Board of Trustees of the one and the Board of Directors of the other, respectively, attested by the signature of the President and Secretary of each organization.

Sec. 2. All property belonging to the American Institute of Architects and to the Western Association of Architects shall, upon consolidation, become the property of the reorganized body.

ARTICLE XIII.

The officers elected at the first Convention of the reorganized Institute shall enter upon the discharge of the duties of their respective offices immediately after their election thereto, and shall hold office until the first of January, 1891, or until their successors shall have been elected and shall have qualified.

ARTICLE XIV.

This Constitution and these By-Laws, and the consolidation of the American Institute of Architects and the Western Association of Architects into the reorganized American Institute of Architects therein provided for, shall not take effect until the meeting of the two organizations in joint convention.

TWENTY-THIRD ANNUAL REPORT OF THE BOARD OF TRUSTEES, AMERICAN INSTITUTE OF ARCHITECTS.

TO THE AMERICAN INSTITUTE OF ARCHITECTS:

Since the Convention of last year, held in October, in Buffalo, your Board, under the chairmanship of the President, have held fifteen (15) meetings in the Institute quarters, Welles Building, 18 Broadway, New York.

The most important and absorbing work of your Board has been that with reference to consolidation, which has been the subject of much correspondence with the special committee charged with the details of the matter, and has exclusively occupied the attention of a number of meetings — one of them, that of September 19th, being held jointly with the Directors of the W. A. A.

The results of these deliberations have already come before you, first early in the year, in the circular embodying a proposed Constitution and By-Laws for the new organization; then in the letter-ballot, giving the almost unanimous vote in favor of unification, and now in this joint-meeting of the two old organizations, and the programme or order of business before you.

Your Board, in its Annual Report two years ago, gave you the information that a responsible and active society of architects in Western New York, then of goodly numbers, and which has since increased to over fifty members, and seems to be — not without good grounds — hopeful of carrying through the Legislature of its State a most important measure, and, as probably most well-trained architects think, a most desirable one for the good of the profession and its art, your Board stated that this Association had made overtures to it for affiliation with the Institute, in a body, as one of its Chapters, provided the Board would commit itself beforehand to give its influence and labors toward carrying out this measure; but that your Board had not found it right to consider any proposition implying the least jeopardy to its paramount obligation, as trustees of the interests of the profession, to keep its judgment untrammelled by pledges.

Last August another association of, to quote, "about a dozen of the best men" in the place, and now numbering twenty, also wrote to your Secretary, with a view to coalescence with the Institute as one of its Chapters. In this case no conditions were imposed, except the implied one, that the association should be admitted bodily. As, however, the Convention showed it was not the desire of the Institute to make the condition of admittance as a body free to any of the architectural fraternities except the Western Association of Architects, your Board could only encourage those of the fraternity in question who were not already members of the Institute to send their credentials and applications as individuals.

Both of the brotherhoods above mentioned have since affiliated with the W. A. A.

Correspondence of a similar nature has been had with various parties in different sections of the Union, one location being in Southern California. But, although in answer to a letter from the Secretary of the W. A. A., your Board expressed its opinion that either the Western Association or the Institute might, with perfect propriety, take in new members during the processes toward consolidation, which have so largely employed each organization during the last two years, your Board, as stated in its last report, thought it on the whole better for its own part not to seek new candidates, but mainly to deal with its old applications, and during the closing year has elected but nine (9) Fellows, viz.: Messrs. J. H. Pierce, of Elmira, N. Y.; E. M. Buell and G. W. Baxter, Jr., of Syracuse, N. Y.; G. F. Shepley, C. H. Rutan, C. A. Coolidge and W. C. Richardson, each of Boston, all by first election; and Messrs. W. M. Poindexter, of Washington, and O. Dockstader, of Elmira, N. Y., formerly Associates, while to the latter grade there have been added three new names, those of Messrs. Edward Sidel, of Birmingham, Alabama; Amos J. Boyden, of Philadelphia, and Albert L. West, of Richmond, Va.

To the Corresponding Membership of the Institute has been added the first individual, outside of the Caucasian race, that has appeared in the list of any grade of the Institute, viz.: Mr. Kingo Tatsuno, a graduate of the Imperial Institute of Japan and architect of the proposed Bank of Japan, to whom your Secretary furnished letters of introduction during his late visit to this country, on behalf of his government, for the purpose of studying the construction and methods of our banks. Your Secretary has also given letters of introduction to another Japanese gentleman, introduced by Mr. Tatsuno, viz.: Mr. S. Sadachi, of the Ministry of Communications of Japan, and on a visit here for the purpose of investigating the construction and methods of our post-offices.

Thus the profession and the Institute have contributed a link toward that mutually strengthening and sustaining chain of brotherhood, with which modern civilization, with its arts and sciences, binds together all the nations of the earth and all the children of the one common Father.

Your Board, as usual, has been called in several instances to

consider and adjudicate upon the rights of the different members of the Institute who have been party to controversies relating to the designing or execution of contemplated buildings, the most important being that between the United States Government and the originally appointed firm of architects of the Congressional Library building. Another case related to the accepted preliminary designs of a large church in Buffalo; another, to a monument in Cleveland, and another to the working-drawings of a house in Omaha, Neb. Appeals have been made by several other members for adjudication as to alleged inter-professional grievances, on which your Board has not yet had opportunity to take final action.

Prof. Allen C. Conover, of the chair of Civil Engineering in the University of Wisconsin, having informed your Secretary that he was engaged in making tests, for the use of his students, of the various brands of American cements, and having asked for information on various points, your Board referred his letter to Mr. Adolf Cluss, of the Washington Chapter, and Fellow of the Institute, whose valuable paper was adopted as a memorial by that Chapter, on the subject of the establishment of a Central Station for Building Materials in the United States. You will remember, Mr. Cluss made an exhaustive reply, embracing ample information of great service to Professor Conover, who cordially acknowledged his obligations therefor. Your Board recommend the memorial just mentioned to the consideration, and its objects to the promotion of the re-organized Institute.

Near the end of last year, the American Institute of Electrical Engineers, through their Secretary, Mr. Geo. M. Phelps, communicated with your Board on the subject of the coöperation of this Institute, with that, and perhaps other technical bodies for the purpose of joint occupation of permanent quarters. Your Board appointed Mr. Littell a committee of one to confer with the Society; but for obvious reasons, the project was not encouraged till further progress should be made in the matter of consolidation.

An old member of the Institute, Mr. R. M. Upjohn, has proposed the following amendment to the Schedule of Charges of the Institute, viz.: "When the drawings and specifications are ready for contract, the architect is entitled to 3½ per cent."

Before closing its labors under the present By-Laws, your Board desires to call your attention at once — instead of waiting for results, as has been its custom under less exceptional circumstances — to a correspondence which may possibly prove the forerunner of the available citation of important authority in favor of the profession:

New York, August 24, 1887.

To the Editor of "Webster's Dictionary": —

Sir, — In view of the report that "*Webster's Dictionary*" is in process of re-editing, it has been suggested to me by a prominent member of the American Institute of Architects to call your attention to the fact that in their specifications, contracts and other documents the architectural profession is accustomed to make a distinction between the words "supervise" and "superintend." They use the former word to express the general and intermittent oversight given by an architect, with special reference to masses and main features in the manual execution, in brick, stone, wood or what not of the various designs which have first been created from his brain on the drawing-board and in the specification; and they use the word "superintend" to express the constant and close attention to detail given, when called for under the contract, by some subordinate (in England generally, and here sometimes, called the clerk-of-the-works) to each structure erected from such designs.

One of the most fruitful causes of friction and trouble in this world is the more or less diverse valuation placed on the same word by different people, each party consciously or unconsciously interpreting it in its own interests. A common understanding of the terminology employed in the dealings between architects and their clients is, therefore, most desirable, and this remark applies not only to American, but to all the English-speaking countries which your dictionary influences.

This is why I venture to ask your attention to the subject of conforming its *ex-cathedra dicta* to the varying shades of meaning that appear to us to be consonant alike with the sources of the two words in question and with their acceptation among cultivated specialists, if not universally among the laity. I am quite conscious that my request may seem to be a bold one, but it can hardly fail to strike you that the concentrated attention inevitably called for from a specialist as regards only two words in his nomenclature — and those as important as any in relation to his professional practice — may somewhat balance that diffused over the myriad definitions of his lexicons, even by a philologist competent to regulate the never-ending changes and accretions in the many-score thousand words of our vernacular.

Yours very respectfully,

A. J. Bloor, *Secretary, A. I. A.*

A reply was received from the publishers, thanking your Secretary on their own behalf and that of the editor, for the communication and promising to give its matter consideration.

Recently, your Secretary, in view of the fact that the "*Century Dictionary*" is underway, transmitted a copy of the above-mentioned letter to the editor-in-chief thereof: the reply to which, under date of September 10, 1889, from one of the publishers is as follows:

"Prof. W. D. Whitney, has sent me the copy of your note to the editor of '*Webster's Dictionary*,' about the words, 'supervise' and 'superintend.' Your suggestions have been placed on file, and will be carefully considered when the words in question come up for discussion."

Respectfully submitted for the Board of Trustees, by

A. J. Bloor.

November 13, 1889.

REPORT OF THE COMMITTEE OF THE WESTERN ASSOCIATION OF ARCHITECTS ON THE STATISTICS OF COMPETITION.

The following report was accepted by the Convention and referred to the appropriate committee for consideration:

This Committee has the honor to report that in view of the ascertained scarcity of authentic and valuable statistics on competitions, its powers were enlarged at the last convention of this body, and it was authorized to attempt to secure amelioration of the ordinary terms of competitions, wherever favorable opportunity might offer for its intervention.

In accordance with these instructions the Chairman soon afterward addressed a note to the managers of a competition in a large Western city, pointing out the most objectionable of the terms offered, which gave no protection whatever to competing architects, and offering, if desired, to indicate such changes in the terms as experience had shown to be necessary to the proper conduct of such enterprises, and to enlist the participation of reputable members of the profession. A copy of this note was sent at the same time to a leading architect in the same city, inviting correspondence if the further interposition of the Committee was desired. No reply was received to either letter.

In co-operation with several St. Louis architects, this Committee has been more successful with the St. Louis City-hall Competition. Every modification in the terms which it has proposed has been granted willingly, and the Code finally adopted is believed to comprise practically every condition which architects are agreed upon as necessary, and to be one of the most comprehensive, enlightened and equitable documents of the kind which have ever been put forth by any municipality or other body desirous of securing competitive designs from architects. The credit for this result is due, however, quite as much to the assistance of St. Louis architects, individually, as to your Committee, — a most satisfactory harmony having prevailed throughout.

It is the belief of your Committee that this St. Louis Code is destined to form a precedent of the highest value in influencing the conduct of all subsequent enterprises of this character. While neglecting no interest of the city, as the promoter of the competition, its terms towards architects are so fair and comprehensive, and so adequate to the recognized necessities of such contests, that its adoption marks an area in the history of this vexed subject. It is confidently believed that in many cases a reference to this document will be entirely sufficient to secure the same conditions from other competition managers.

With this view your Committee presents herewith a copy of the Code for the St. Louis City-hall Competition, and asks that it be filed as an appendix to this report.

IN REGARD TO THE GENERAL SUBJECT OF ARCHITECTURAL COMPETITIONS.

1. Our observation leads us to concur in the already established opinion that, as usually conducted, they are not only unnecessary, but positively detrimental to the profession and to the architecture of the country. Clients do not gain thereby in the quality of architectural services received, or the quality of the designs adopted.

This results not so much because it would be impossible to select, from the number submitted, a better design than any given one obtained without competition, as from the method in which competitions are usually decided. It rarely occurs that expert juries are called in, and when they are, their decision is treated as suggestive rather than as conclusive, — the final judgment being rendered by a committee, not one of whom even pretends to know anything about architecture.

2. One difficulty in the way of accomplishing more by your Committee is the fact that we frequently do not hear of competitions until it is too late to secure any modification of the terms offered.

If the members of the profession, upon hearing that a competition was contemplated, would notify your Committee at once, and in the meantime refrain from signifying any acceptance of unsatisfactory terms until we could communicate with the parties inviting plans, we believe it would be possible in many cases to arrange for better terms. If we failed, no harm would result from the effort.

3. As many plans are usually submitted which are not paid for, and those accepted are furnished at the usual rate, the whole competition business is financially detrimental to the profession. Even the successful competitor is not only put to the risk of entirely losing his work, and is compelled to make himself a kind of Insurance Company, but he is actually put to greater expense and trouble than he would be if employed without competition.

In order to institute any kind of intelligent comparison between plans, it is necessary to incur more expense in the preliminary studies than if there were no competition. There being no free interchange of thought as to requirements between the client and competing architect, it often occurs that competitive plans must be amended to a great extent after the decision is made, and at large additional expense. Your Committee are unable to see why the successful competitor — to say nothing of those whose plans are not adopted — should be compelled to render all this extra service brought about on account of the competition, without receiving any renumeration therefore. Your Committee would therefore recommend that in the schedule of charges for professional work, the rate

for competitive services be fixed at *six* instead of *five* per cent,, charging two per cent for preliminary studies rendered in competition.

EXTRACTS FROM THE CODE OF COMPETITION FOR THE NEW CITY-HALL, IN ST. LOUIS.

ALL plans submitted are required to be drawn on a scale of one-sixteenth of an inch to a foot.

The elevations shall be in line-drawings.

No shading to be done on elevations, but windows may be tinted to show glass.

The plans submitted shall exhibit each floor plan, each elevation, and one cross-section. Additional sketches may be submitted to show particular features of rooms that cannot be shown in the plans and section.

The building shall be fire-proof throughout, — walls, floors, supports, girders, roof, etc. The flooring of rooms, the doors and window frames, etc., may be of wood.

The exterior shall be of Missouri granite and brick. All ornamental features shall be of the most durable character. Cornices, finials, etc., where of metal shall be of copper; galvanized-iron will not be allowed. Roofs shall be covered with slate or copper. The cost of the building is limited to one million dollars.

A type-written description of the building should accompany each set of drawings, giving, as clearly as possible, such information as cannot be shown on the drawings concerning materials, methods of construction and decoration.

Each drawing and the description must be distinguished only by a motto or device, which should be repeated on the outside of a sealed envelope containing the author's name and address.

The decision will be rendered on or about December 1, 1889.

A design will be excluded from competition if any attempt is made by its author, directly or indirectly, to disclose his identity; or to influence the decision of the members of the commission or their adviser; or if sent in after November 1, 1889; or if in any particular violates the conditions herein stated; or if it shall be found that its probable cost will exceed the limits herein named by more than fifteen per cent.

The heating, plumbing, lavatory, and elevator service to be complete and of approved modern methods. Janitor's rooms and closets will be required on each floor.

The space set forth for the rooms may be increased by the competing architect to meet the necessities of his plans.

An expert adviser will be employed by the commission to advise the members as to the merits of the plans submitted. The selection for this purpose will be Professor Ware or Professor Ricker.

The successful competitor will, if the work is carried out, and he so desires, be employed to furnish the detailed and working drawings, and superintend and supervise the erection of the building, at the rate of compensation established by the schedule of the American Institute of Architects, of which, in such event, the five thousand dollars paid for the plans shall form a part; but if, on the disclosure of the names, the successful competitor shall prove to have had slight experience in building, the right is reserved to associate with him a consulting architect, to whom a proper proportion of the fees shall be assigned.

Parties who so desire may include perspectives in pen-and-ink drawn to the same scale as the plans and elevations, from a standpoint distant four hundred feet from the nearest part of the building, the fronts shown to make equal angles with the plane of the picture, and the horizon to be ten feet above the base line of the building. The perspectives to be without shading or landscape or other accessories, except a single human figure six feet high to give the scale.

Rejected designs will only be used, in whole or in part, by agreement with and compensation to their authors.

FIRST MEETING OF THE BOARD OF DIRECTORS OF THE AMERICAN INSTITUTE OF ARCHITECTS.

CINCINNATI, O., November 21, 1889.

THE following members were present, President Hunt being in the chair: Messrs. Briggs, Bruce, Carlin, Cutter, Gibson, Hunt, Illsley, Kendall, Cummings, McLaughlin, Root, Smith, Treat, Littell.

The following gentlemen were elected as members of the Executive Committee, of which the President, Secretary and Treasurer are *ex-officio* members: Messrs. Kendall, of New York, three years; Adler, of Chicago, three years; Gibson, of New York, two years; Carlin, of Buffalo, one year.

Mr. Cummings reported on behalf of Committee on Relations between Chapters and the Association as follows:

"At the recent Convention of the American Institute of Architects, the undersigned were appointed a committee to consider whether any method could be adopted by which the complication at present thought to exist in the relations of Chapters and individuals as to the membership of the American Institute of Architects could be removed.

"The Committee have carefully considered that subject, and have found themselves confronted by difficulties so great as to prove insurmountable by any wisdom which the Committee can apply to them.

"The Committee recognize fully the desirability of providing that every Fellow of the Institute shall be also a member of some one of the local societies organized as Chapters. In no other way can the Institute be so well assured of the fitness of a candidate for membership as by his being certified to be a member in good standing in one of the Chapters; and the fact of all the Fellows of the Institute being at the same time members of the Chapters tends to confirm the solidarity of the Chapters with the Institute which is so eminently to be desired.

"But, on the other hand, there are doubtless many cases in which an architect residing in a town where no local Chapter exists, where the nearest Chapter may be located at a distance of hundreds of miles, may desire to become a member of the Institute. He may be in every respect qualified to become a useful member of the Institute, and to receive both pleasure and profit from his association with it. To refuse him admission except on condition of his joining a Chapter (perhaps in another State) with which he has no natural affiliations, with the members of which he has no acquaintance, seems a measure hardly less than tyrannical.

"The Committee confess themselves unable to see any method by which the difficulty can be overcome, and they therefore ask respectfully to be excused from further consideration of the subject, and to recommend it to the wisdom and judgment of the Board of Directors." For the Committee,

(Signed) CHAS. A. CUMMINGS, *Chairman.*

Mr. Littell moved: "That the full powers of the Board of Directors not expressly reserved in Art. VIII, Section 2 of the By-Laws, be rested in the Executive Committee, subject to the obligation to report to the Board from time to time when called upon to do so." Motion carried.

Mr. Gibson moved: "That the Executive Committee shall hold quarterly meetings, and other meetings at the call of the President when the Secretary shall report to him a necessity for the same, or when three members of the Committee shall request him to call such meetings for special business." Motion carried.

Mr. Cutler moved: "That in the event of inability to attend a meeting of the Executive Committee, the member so prevented from being present shall notify the Secretary, who shall thereupon, if deemed expedient, notify a Director, who, attending the meeting, shall have full power to act as substitute." Motion carried.

Mr. Gibson moved: "That it shall be the duty of the Secretary to notify members of the Executive Committee of any meeting, ten days in advance of such meeting, and members shall at once reply stating their intention or inability to attend." Motion carried.

Mr. Briggs moved: "That the following form of ballot be used in the election of members":

Office of Secretary, A. I. A., ——— 18

Dear Sir, — Please vote by striking out the alternative word under the heading "vote," and return the sheet to me at your earliest convenience.

Vote.		Applicant.		Lay Indorsers.			Indorsing Members.	
No.	Yes.	Name.	Address.	Name.	Occupation.	Address.	Name.	Address.

——— *Secretary, A. I. A.*

Motion carried.

Mr. Carlin moved: "That the Secretary shall enclose with each ballot for membership, a stamped envelope addressed to himself with the words 'Ballot for Membership' printed on the outside." Motion passed.

Mr. Gibson moved: "That it shall be the duty of the Secretary to notify each candidate for membership of the result of the letter-ballot, and enclose a copy of the Constitution and By-Laws and direct his attention to Article VII, Section 1 of the By-Laws, and to notify the Treasurer of the new membership election." Motion carried.

Mr. Gibson moved: "That the questions referred to in Article X of the By-Laws be referred to a special committee to be appointed by the Chair and the report at or before the next quarterly meeting of the Executive Committee." Motion carried.

Mr. Briggs moved: "That a Committee of Education be appointed by the Chair." Motion carried.

The following committee was appointed:

Messrs. Russell Sturges, Prof. *pro tem* Columbia College; Wm. R. Ware, Prof. Architecture, Columbia College; T. Clifford Ricker, Prof. Architecture, Champaign, Ill.; T. M. Clark, Massachusetts Institute of Technology, Boston.

Mr. Kendall moved: "That the Board of Directors now proceed to nominate substitutes for such of its members as were to-day elected and who may be unable to serve: and that such nominees be substituted in the order of nomination." Motion carried.

The following gentlemen were nominated: Alfred Stone, Levi T. Scofield, W. N. Poindexter, J. W. Yost, E. C. Cabot, G. W. Rapp, W. S. Wicks, N. S. Patton, W. G. Preston, A. J. Bloor, E. I. Nickerson.

The motion by Mr. Glenn Brown presented to the Convention and referred to the Board of Directors was tabled.

The resolution related to new sections to be added to the By-Laws after Section 1 in Article II.

Mr. Briggs moved: "That the schedule of charges adopted by the American Institute of Architects and the Western Association of Architects, in 1884, be reaffirmed by the American Institute of Architects and printed as an appendix to the Constitution and By-Laws, and also in the form of a circular with the words 'Minimum' prefixed before 'Charges.'"

And if the circular be issued to non-members it shall be plainly marked in large red letters "Issued to non-members of the Institute" printed diagonally across its face.

Adjourned, JOHN W. ROOT, *Secretary.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

AN EARLY PRACTITIONER.

NEWPORT, R. I., November 19, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In a file of the *Pennsylvania Packet*, for 1786, under "Providence, March 25, 1786," I find the following interesting account of an architect of that period; but have not been able to gather anything in regard to the man or his career. I send it to you with the hope that some reader of an antiquarian turn may be able to tell us something of this early practitioner. GEO. C. MASON.

"PROVIDENCE, March 25, 1786.

"Last week died at East Greenwich in a very advanced age, George Brown, Esq., late of this town. His remains were brought here, and respectfully interred on Monday last. 'He hath often,' saith a correspondent, 'related with uncommon exactness, the manner in which William III landed in the year 1688, in England. He assumed to be seventeen years of age, but from the manner of his narration, accurate knowledge, and not recollecting from reading or tradition, it is probable that he must at that period have been more advanced in years. Sometime afterwards he landed in Boston, having acquired the art of architecture in theory as well as practice of that calling. There he was eminent as a master-builder, being capable of instructing all others in that useful occupation, till his experience and integrity among a jealous people, placed him at the head of the nurses when the small-pox first raged with uncommon severity in the metropolis. Having given entire satisfaction in that important trust, curiosity led him to this State early in the beginning of the present century. His superior knowledge of his occupation gained him an ascendency, which, joined to a ready will and benevolent disposition, connected him with a worthy family at Pawtucket, by the name of Smith, into which he married; and altho' at that time arrived to the middle age of man, he left a worthy progeny, whose venerable silver locks denote that they are well stricken in years.'

"Many anecdotes might be told corroborating the foregoing account; one shall suffice. Being in company with the late Captain Bull, of Newport, two or three years before the late war, Captain Bull was asked by Captain Brown, his age? Captain Bull replied that he was in his 84th year. On comparing the ages Bull said their acquaintance commenced when he was a youth and Brown well in years. Brown was supposed to have been one hundred and twenty years of age at the time of his death."

FORMS OF ARCHITECTS' CERTIFICATES.

NEW YORK, N. Y., November 18, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In reference to responsibility of architects, do you consider the form issued by Palliser, Palliser & Co., and the form "Agreement for Building, No. 2," by Reid Gould, of New York City, safe in respect to the architect's certificates. My inquiry is suggested by your remarks in the *American Architect*, of 16th inst.

Truly yours, CONTRACT.

[WE are not familiar with either of these forms. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

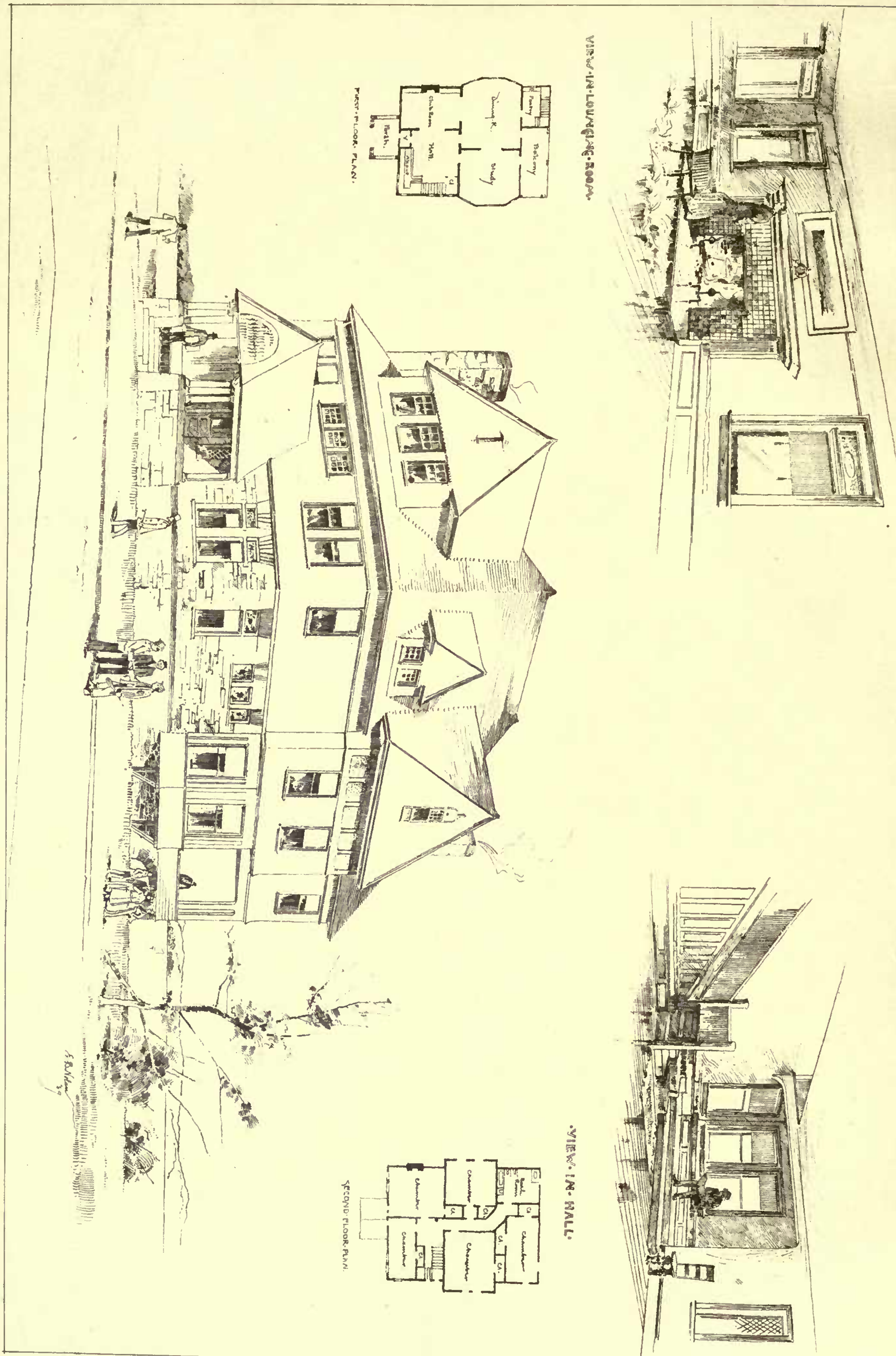
ROSA BONHEUR AND THE LEGION OF HONOR. — The following story of the granting of the Legion d'Honneur to Rosa Bonheur is told by M. Peyrol in the *Art Journal:* "Fontainebleau was one of the favorite summer residences of Napoleon III, and one day the Empress thought she would like to make the artist's personal acquaintance. With that end in view she paid an impromptu call, and stayed some time watching Rosa Bonheur at work. She was so impressed by the painter's talent that she begged the Emperor to bestow the Cross of the Legion of Honor upon her. But it was not to be. The cross had never been given to a woman, and the Ministers protested against a precedent. But the Empress bided her time till the following year, when, during the absence of the Emperor in Algeria, she acted as regent. One morning a servant hurriedly entered Rosa Bonheur's studio with an announcement that the Empress was below. In another minute she was in the studio borrowing a pin from one of her ladies. The Empress then kissed the artist, who, glancing down, saw the Legion d'Honneur pinned on her breast."

TRADE SURVEYS.

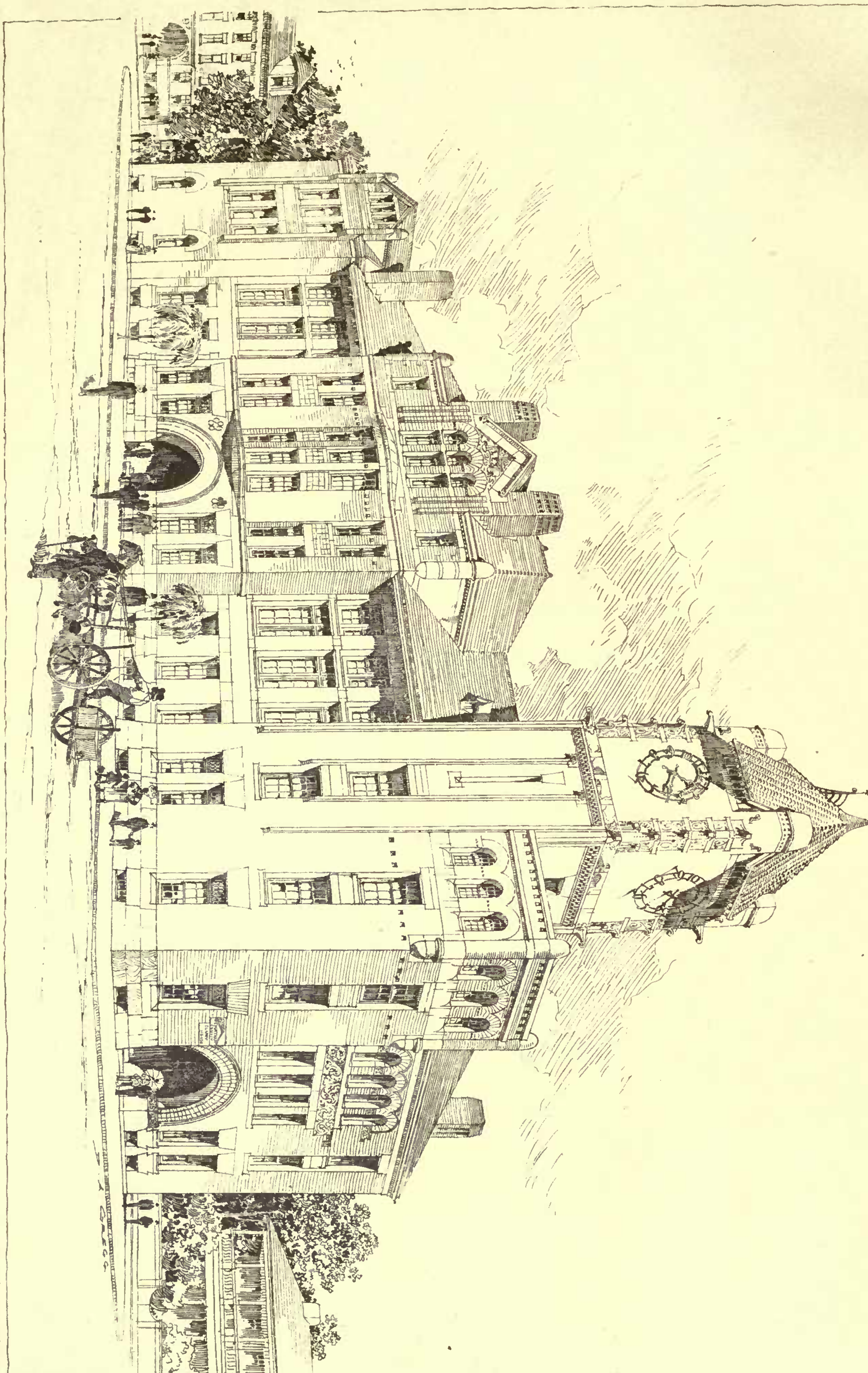
WORD is being passed all along the line that it is now time to make preparations for 1890. The undercurrent of such proclamation is, that there is no probability of any reactionary tendency in prices. It is only this possibility that has checked a great deal of work and preparation for work. If the conviction should become general among banking, manufacturing, railroad, commercial and business circles generally, that there is no danger of such reaction or of any weakening in prices, then buying will set in upon a large scale, at least, so say and talk the jobbing and manufacturing interests. There is a feeling of satisfaction expressed in both manufacturing and financial circles over the probability of an increased coinage of silver, even where there is a theoretic aversion to what these interests regard as an inflation of the currency. Conservative authorities both East and West feel that if there is any mistake to be made, it is more likely to be made in the direction of too little rather than too much silver, or its representative. The Western business sentiment is, apparently, strongly in favor of the proposed increased coinage. The latest utterances East, accept the inevitable. The possibility of a stringency in money is so abhorrent to legitimate business interests that they would even prefer a partial inflation to a general stringency. It may be safely asked, if there is not too much ignorance and too little genuine knowledge upon this currency question; whether what is called inflation, is inflation. The business interests of the country have learned much during the past ten years upon financial questions, but have much yet to learn. They seem to regard with very little apprehension an enlargement of bank credits, but look with suspicion upon a movement which aims at broadening the foundation of actual money. Western ideas and notions are taking a stronger hold upon business men, and it is very safe to presume that the cohesiveness which has been showing itself throughout the West not only on the silver question and on questions of internal improvements, but on other questions of a rather practical character will be asserted more strongly in Congress and in the public prints. The West has grumbled, in a way, over the acceptance of financial standards, notions and ideas to suit the capitalistic East, as the fling is often made, in preference to the business interests of the great producing West and South, whose surplus wealth goes to pay for borrowed money, as it is sometimes put. All the industries throughout the country are in a healthy and active condition. Commercial failures are not increasing, but, when measured by the volume of business done, are waning. New concerns are springing up; new industries are arising, and new schemes are receiving the assistance of money-lenders in a manner and a degree which argues the utmost confidence of those who control the establishment of new enterprises. Trusts have received a set-back in the courts, press and public opinion, and in some States in the West they are being prosecuted and even persecuted by the hostility of public opinion put in the form of legislation. The confidence of investors is increasing, but the latest cables from British markets show that American railway securities are, for the present, almost entirely neglected. Until our transitional measures are effected, foreign confidence will be lacking. It is true that the September net earnings of 110 railways show an increase of over three million dollars, as against the same month last year, and of over four millions in gross earnings. This showing will help forward several railway schemes now awaiting such encouragement. The Silver Convention, which meets in St. Louis this week, will enable the friends and enemies of that movement to measure its probable force. The larger manufacturing interests of the Ohio and Mississippi Valleys are evidently beginning to buy raw material for the winter and spring, and should the movements of the next two weeks prove this to a certainty, the smaller buyers of all kinds of material will find it necessary to follow this policy. The iron and steel makers are still unable to accept all business offered, and the activity of the demand has been made apparent in the East by propositions to start nail factories which have been idle for years. The steel rail-makers have been able to advance prices to $35 in Pennsylvania, and latest advices from that State seem to point to the placing of large orders in December at very little less than that figure.

The anthracite coal production this year is 2,912,000 tons less than last year, but the bituminous production of the Allegheny Mountain regions is slightly over that of last year. Shippers are complaining of a scarcity of rolling-stock at many points, but this trouble will soon be adjusted. The car-builders are crowding their orders through with wonderful rapidity. All of the bridge-builders are making over-time. The lumber manufacturers are preparing to close down for the season, after having provided themselves with a very large stock of lumber for winter work. In the Southwest, quite an impulse has been given to lumbering operations by the extension of lumber traffic into the far West since the opening of spring. The industries of Kansas and Texas have been helped much this year by fresh capital and labor, and at the present time new schemes without number are engaging the attention of capital and of aspiring mechanics and business men in those States. The West is full of schemes for internal improvement, new mining and railroad schemes, manufacturing developments, and there is no reason for doubting a most wonderful industrial development in the West and Southwest next year. The new mining companies which have begun operations within the past year or two are within sight of early dividends. To all appearances, the output of gold, silver and lead will be greatly increased, unless, possibly, lead may be an exception through the lagging demand at present. The great West and Southwest are offering extraordinary inducements to Eastern capital, and there is scarcely an industry but has its promoters urgently pushing its permanent establishment. Even cotton and woollen mills, knit-goods establishments and shoe factories, which naturally regard New England as their home, are finding a healthy atmosphere in these newer States. In the Northwest business is very active. An enormous flour movement is in progress. More or less complaint is made concerning the low prices of farm products in the West, but business channels do not feel any effect. In spite of all that has been said regarding railroad over-building in those States, schemes have recently been perfected for the construction of between two and three thousand miles of new track. The architects and builders, in their recent reports, speak of very good promises for next year. Small investments have paid well, trusts and other financial organizations have made out well, and there will be no hesitating spirit manifested when the time comes to launch out into new building enterprises next season. Confidence in new building operations is shown in all of our large Eastern cities. Municipal improvements are projected which will involve large outlays. Belt-lines, elevated railroads, sewage systems, lighting and water-supply facilities are all engaging attention, and it seems quite probable that more money will be expended in this direction next year, in large and small cities, than we have been accustomed to see. The wage-workers, so far as they have recently spoken, will probably not throw themselves across the pathway that business enterprise has mapped out for itself, but will confine themselves to demands for advantages where they feel they can be safely made.

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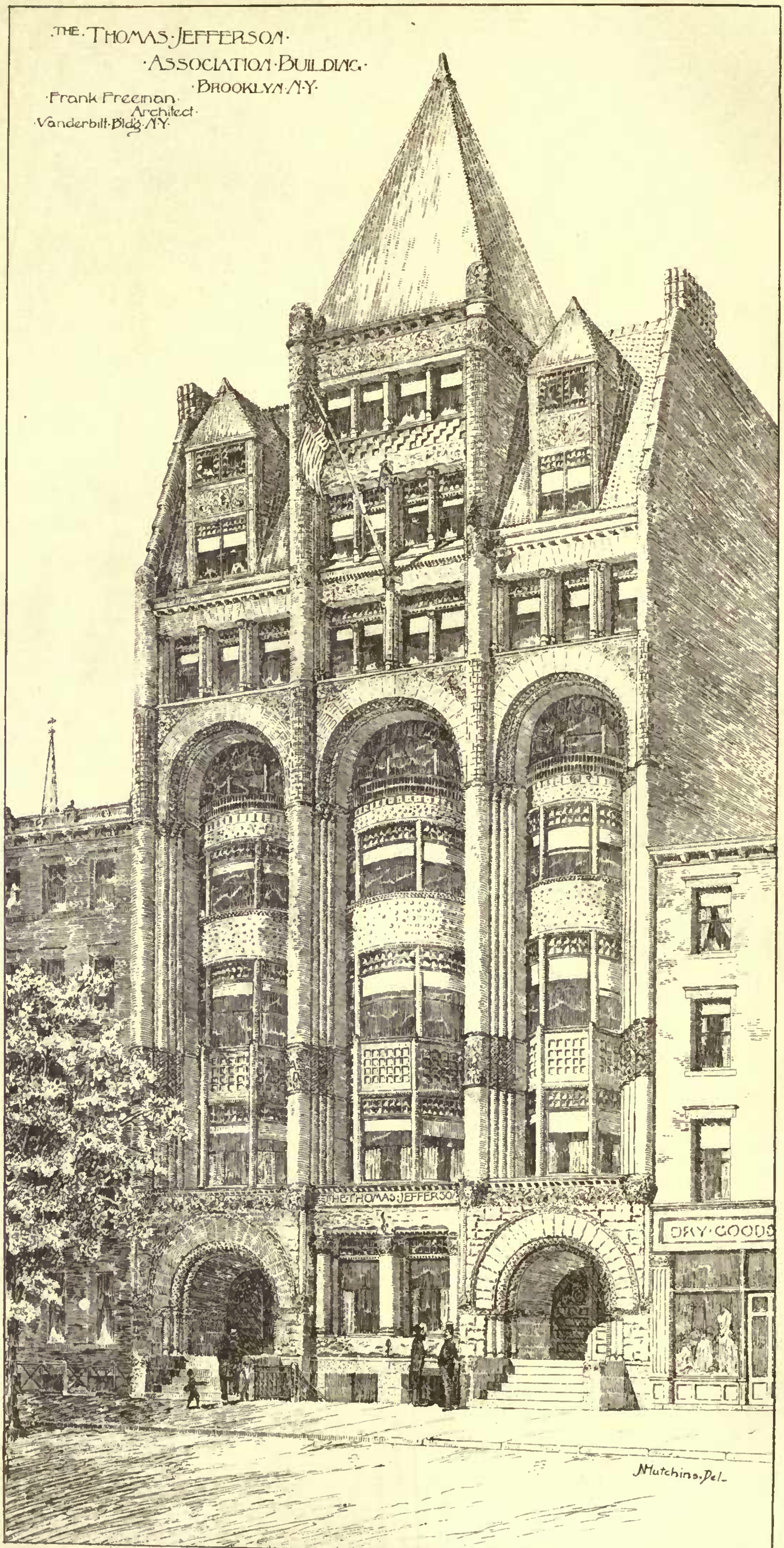


SIGMA·PHI·CHAPTER·HOUSE ... GENEVA·N·Y·
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ROCHESTER·N·Y·
5½-5¾-5¾ WILDER·BLDG·
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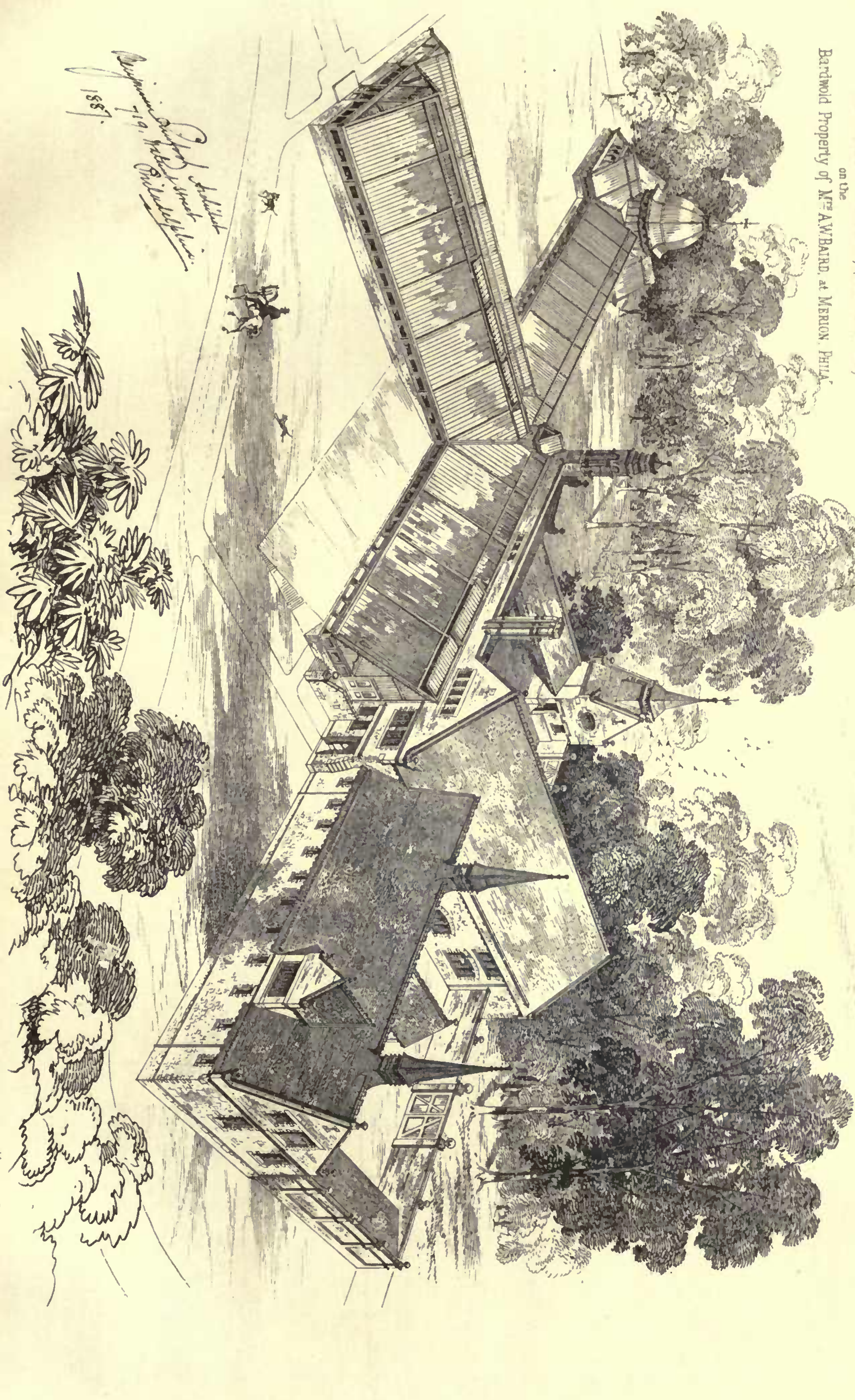
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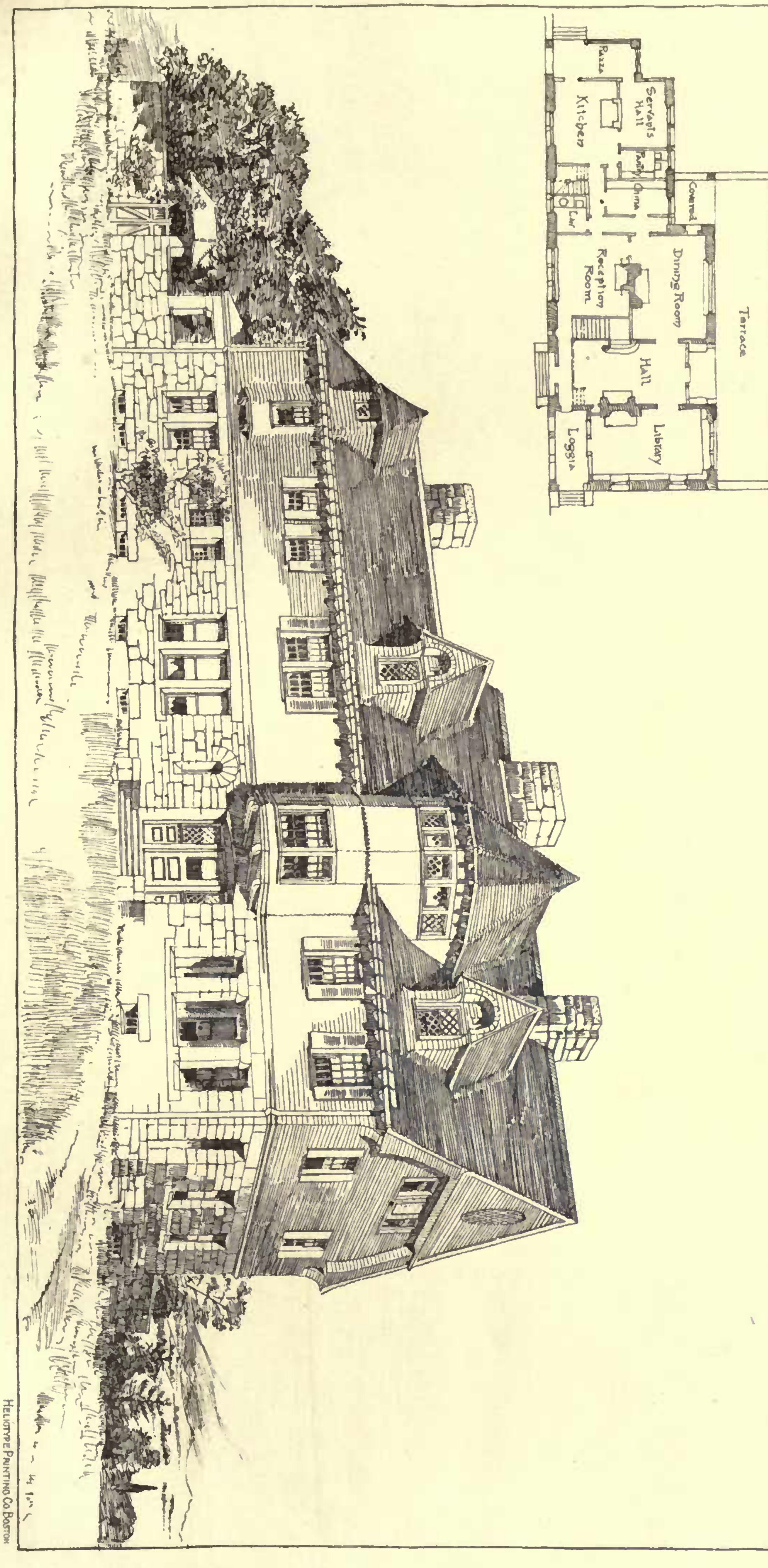
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AMERICAN ARCHITECT AND BUILDING NEWS, Nov. 30. 1889. No. 727.



THE HOME BUILDINGS, (VIEW FROM THE LAWN) on the Bardwold Property of MRS A.W. BAIRD, at MERION, PHILA.

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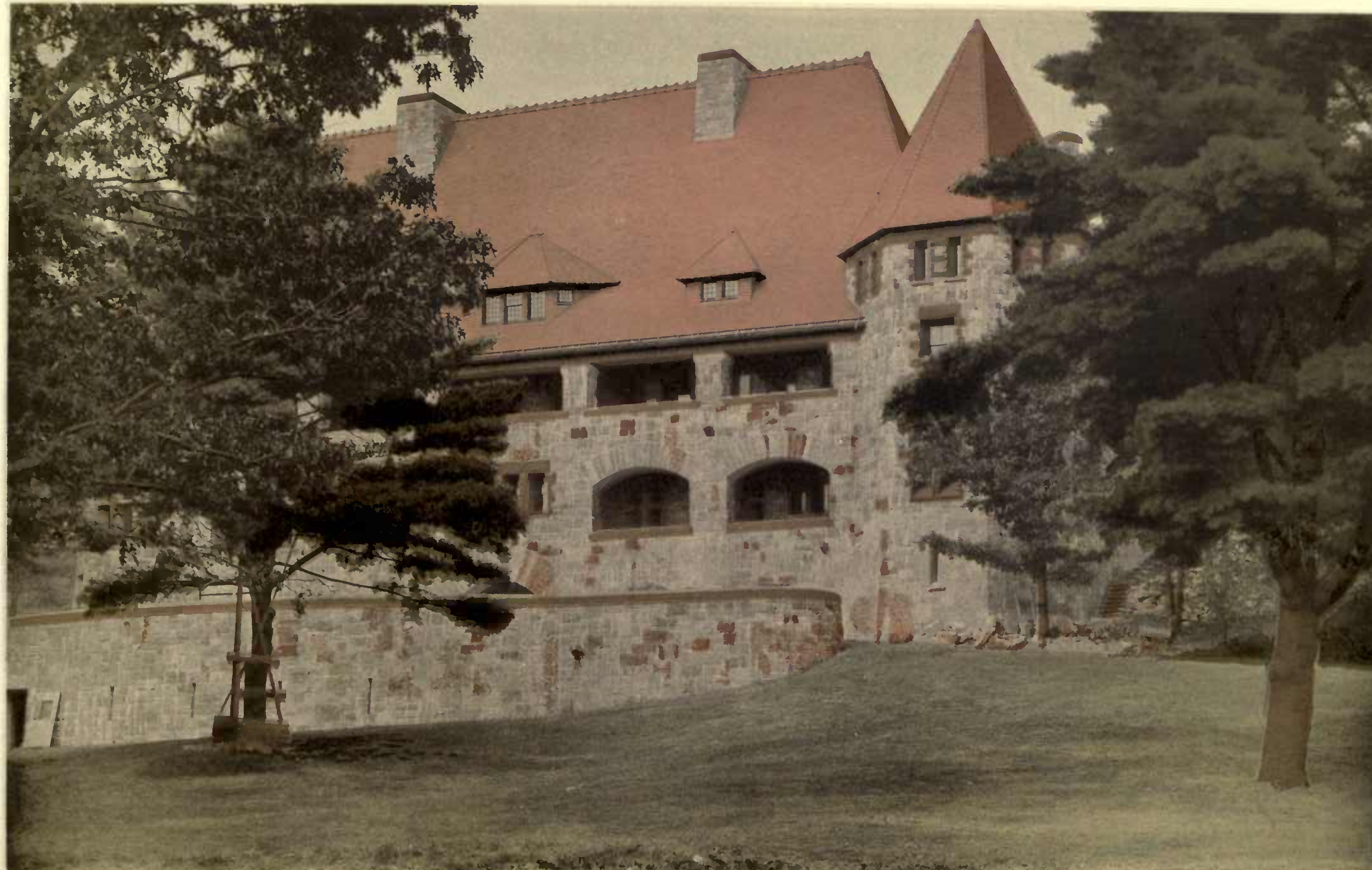


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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXVI. No. 728.

DECEMBER 7, 1889.

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THE recent great fire in Boston has given us some instructive lessons in the art of building. The structures burned were almost all new, and were supposed to be much superior in fire-resisting qualities to the older warehouses in the city. All of them had thick walls, and some were further protected, as was supposed, by having thick plank floors. The Ames Building, in particular, a very costly structure, was considered an excellent example of the "slow-burning" method of construction, being built with very heavy and solid walls of brick and sandstone, with floors of thick plank, supported by heavy hard-pine girders, instead of floor-beams of the ordinary kind, yet within an hour and a half from the time it took fire, notwithstanding all the efforts of an army of firemen and a score of engines, nothing was left of it but the picturesque ruins of the first story walls, and a heap of rubbish in the cellar. The fate of other buildings of similar character pointed to the same conclusion, that wooden girders and plank floors, however thick and heavy they may be, cannot be relied upon to resist for any considerable time the heat from great masses of inflammable material burning beneath them. We know, from what has been observed within the past few years, that a great conflagration is accompanied by a blast of air so hot that brick walls melt before it, and the massive timbers of the Boston stores seem to have been dissipated, rather than burnt in the ordinary way. Whether any of the buildings destroyed had their plank floors protected by wire-lath and plaster we do not know. If not, we have still a lesson to learn as to the behavior of floors so protected under similar circumstances. Another system, which has been adopted in Boston since these buildings were erected, that of placing asbestos paper between the boards of double flooring, yet remains to be tested in a serious conflagration. On a small scale, its use, which is now required by law in Boston, unless the floors are deafened with plaster, appears advantageous; whether it would be equally so on a large scale, no one can yet say.

THE cause of the fire is now supposed to have been the falling of an electric-light wire upon a wire belonging to a system used for transmitting electric-clock signals. Clocks of this sort are rather extensively used in the district where the fire occurred, and it is said that, shortly before the fire broke out, several of the dials in neighboring buildings took fire simultaneously, after the fashion so familiar where telephone lines are crossed with electric-light wires, so that there is certainly a strong probability that some of the dials in the first building burned, which is known to have been fitted with them, took fire in the same manner, and the rooms being deserted by reason of the holiday, burned until they dropped blazing among the inflammable goods beneath them. The very efficient Fire Marshal of Boston is now investigating the causes of the conflagration, and if the disaster is definitely traced to a particular electric-light wire out of its proper place, it will be interesting to learn whether the company owning the wire is not legally liable for the damage occasioned by its erratic property. The profits of the electric-lighting business are now so great, and the capital represented in it so enormous, that it is time to hold it to some accountability for carrying it on with a proper regard for other people's safety. There is in Massachusetts a special statute, providing that railway companies shall pay all damages occasioned by fires kindled by sparks from their locomotives. Under this statute the Fitchburg Railroad Company has just paid two hundred and fifty thousand dollars to make good the loss caused by one of its erratic sparks, and, in default of any better way, the statute might be extended, so as to make electric-light companies, which have far more control over their incendiary currents than railway companies have over sparks from their locomotive smoke-stacks, similarly responsible.

THE profession is certainly to be congratulated upon the results of the Cincinnati Convention. Although it does not appear, from the bare reports, that a great deal was accomplished; the most important, and most delicate business of all, the placing of the affairs of the Institute in able, conscientious and efficient hands, was executed in an admirable manner. Concerning the President, we could say nothing which would add to the veneration and affection with which that noble old artist, Mr. Richard M. Hunt, is universally regarded by his brother architects, and it is hardly more necessary to speak of the respect and regard which Mr. John W. Root, the new Secretary, has won in the profession throughout the country, not less by his ability as an artist than by his unselfish enthusiasm and devotion to the interests of architects generally. The names of the other officers of the new Institute, which we need not mention particularly, are all familiar to our readers as representing the most eminent talent, and the most distinguished prudence and business ability, among the older, the middle-aged and the younger members of the profession. Such men as the Convention has chosen do not carry out a trust of that sort by doing nothing; and what they do is sure to be well done. There is enough for them to do, and it should be our part now to strengthen their hands by doing our utmost to increase the membership of the Institute. Every new recruit of good character now will help all the rest, and there is no reason why, a year from now, there should be a single skilful and honorable architect in the United States or Canada outside the Institute ranks. There would not be one outside those ranks if it could be clearly shown how great were the advantages of being within them, and every addition in the membership makes it more desirable for the rest of the profession to come in.

AN artistic event of very considerable importance is the completion of the Bennington Battle Monument in Vermont. It will be remembered that the subject of marking all the principal battle-fields of the Revolution has been a good deal agitated of late, both in and out of Congress, and there is no doubt that before long all the most important landmarks of our early history will be consecrated in some such way as that at Bennington. We have often referred to the Bennington Monument, the design, somewhat modified, of Mr. Rinn, of Boston, and hope to illustrate it in a worthy manner when the staging which now hides it shall have been removed.

MR. JOHN BEVERLEY ROBINSON, the popular ex-President of the New York Architectural League, is a man who has decided opinions on various subjects, and is not afraid to mention them. Just now the New York Building-laws are in process of revision, and a committee of the League, with the help of Mr. D'Oench, now one of its members, and recently the Chief Inspector of Buildings of New York, has been doing some very useful work by carefully considering them, clause by clause, and proposing amendments to what is already by far the best building code in this country, if not in the world. A few days ago, at a meeting of the official Committee on Revision, Mr. D'Oench presented the suggestions of the committee of the League, and afterwards, as in duty bound, read a

report, presented by a minority of one, consisting in the above-mentioned Mr. John Beverley Robinson, who did not concur with his associates in their proposed modifications, but proposed to amend the statute as the little boy improved his cat, by trimming off its tail just behind the ears. In his opinion, "all building laws" were "an abridgment of the liberty of the citizen," and he regarded it as "the duty of an architect to evade the law on every possible occasion in the interests of his client." Considering the severe penalties which the law imposes on those who evade it, there may be a doubt how far a client's interests are served by exposing him to them, and we are sure that Mr. Robinson's kind heart will acknowledge that the liberty of citizens is quite as much imperilled by offering them houses to live in which are liable, through the greed and carelessness of the owners, to burn up and roast them all alive at any moment, as by compelling the owners to furnish fire-escapes; but it is certain that architects in the large cities are often irritated by the narrow limitations to which the law confines them, and it is to be hoped that some time a way may be found for allowing greater freedom to professional men who can be relied upon not to abuse it.

SOME extraordinary experiments have recently been made by MM. Joubert and de Neuville in France, from which it appears that the vibrations of the luminiferous ether, or whatever else may be the molecular movements by which electric currents are made manifest to our senses, are capable of exciting what seem to be sympathetic vibrations in neighboring objects, exactly as in the case of the slower and coarser atmospheric vibrations caused by sound. It is well-known that large elastic objects have a note of their own, and will respond, sometimes very vigorously, to a musical instrument giving a sound in harmony with it; so that a tumbler on a table may easily be broken, by the violence of its own vibrations, if a violin near by is made to produce the note with which it is in sympathy; while bridges are often so dangerously shaken by their efforts to respond to a musical sound, or even to any measured impulse, that it is usual, in marching troops over them, to have the men break ranks and walk irregularly, and, on many bridges, band-playing or other music is expressly prohibited. To produce the corresponding electrical phenomena, it is necessary to arrange a conductor so as to receive impulses with extreme rapidity, the period of each impulse not exceeding a few billionths of a second. This is done by cutting in two in the middle a conductor of the form sometimes used for the prime conductor of a friction electrical machine, consisting of a straight bar with a ball at each end. The two portions of the conductor are slightly separated, and the cut ends are furnished with little balls, which are set at a distance of a few millimetres from each other. The other ends of the conductor are then connected with the poles of a Ruhmkorff coil, and sparks begin to pour in streams between the small balls. Many trials are usually necessary before the exact rapidity of movement required is found. Much depends upon the size of the coil, the distance of the small balls, and even on their degree of polish, since a rough surface gives a much less positive spark than a perfectly smooth one, and, for some strange reason, a strong violet light stops the vibrations immediately. When, however, all the conditions are favorable, and the electric note, so to speak, has been found to which neighboring objects are attuned, every metallic object, large or small, in the room or out of it, for a considerable distance on all sides, will give out sparks. If a piece of wire within the magic influence is bent nearly into a circle, a stream of sparks will appear between its ends; two bits of metal, placed near together, will exchange sparks, and the gas and water pipes yield similar ones whenever touched with a conductor. The effect diminishes as the distance from the exciting agent increases, but is still perceptible a hundred feet or more away, and, curiously enough, the interposition of a wall has no effect whatever, masonry being, apparently, as pervious to the electrical vibrations as a net would be to sound. From a metallic surface, however, the vibrations are reflected, and phenomena similar to the interference, reflection and refraction of light can be produced with the electrical vibrations by similar means.

THE story of the purchase of Millet's "Angelus" at the Secretan sale in Paris is familiar to most of our readers, but this heroic struggle between the American Art Association and the representatives of the French Government was not the only interesting circumstance connected with the sale. M. Secretan had spent two million dollars on his pictures and bric-à-brac, and there were a good many valuable things besides the "Angelus" in the collection. Among other matters was a picture by Meissonier, about the size of a silver dollar, painted on a wager, in a few hours. This curiosity, for it could hardly be called a work of art, brought at the sale more than four thousand dollars. Three other Meissonier pictures were sold on the first day, but only one, the "Chess-players," brought as much as the little "Five-franc-piece," one, a sketch in India ink and body-color of a "Mounted Trumpeter," selling for only thirteen hundred dollars. On the second day another Meissonier, the famous "Cuirassiers," was sold, bringing thirty-eight thousand dollars. Aside from the Meissoniers and Millets, the prices realized do not seem to have been extremely high. Delacroix's "Return of Columbus," which was sold a few years ago for sixteen thousand dollars, brought now only seventy-two hundred, and two Fromentins, the "Arab Children" and "Arab Horsemen," sold respectively for four thousand and twenty-seven hundred.

THE surplus profits of the Paris Exposition, after paying all expenses, are officially stated to amount to sixteen hundred thousand dollars, which will be equally divided between the State and the City of Paris. The subscribers to the guaranty fund, who showed great public spirit and patriotism when the success of the affair was in doubt, will not be called upon at all, and it is to be hoped that some of them, at least, will indirectly have gained by the exhibition. The receipts during the last Exposition in Paris, if we are not mistaken, were less than the outlay, but it was estimated that the State more than made good its contribution to make up the deficit, by the increased sale of postage-stamps to strangers and others interested in the show, while the City of Paris gained by the *octroi* duties on the provisions brought in to feed the visitors, as well as in other ways, more than enough to cover its expenditure on the affair. It is intended for the present to let the buildings on the Champ de Mars remain. The Eiffel Tower, under the contract with M. Eiffel, is to hold its place for twenty years, and the Machinery Hall has already been bespoken by the State for a riding-school for cavalry, while the Palace of Liberal Arts is to be used for a Museum of Decorative Art; and the other large buildings are likely to be wanted for something.

THE Germans, who chose, for political reasons, not to take part officially in the Paris Exposition, have been getting up a portable exhibition of their own, in the shape of a steamship, or, as we suppose some irreverent persons would call it, a floating peddler's wagon, containing various pavilions and compartments, in which are to be shown the wonders of Teutonic manufacture. This movable exhibition is to be prepared at the expense of a number of manufacturers, at the instigation of the Deutsche Exportverein, and the plans have already been completed. The ship itself is to be the largest afloat, measuring five hundred and sixty feet in length, and sixty-nine in breadth, and, besides the samples furnished by its owners, will carry passengers. It is intended to send the affair periodically around the world, taking two years for the trip, which will be interrupted by halts, varying in length from three to fourteen days, at the principal ports. If desired, exhibitors can send representatives in the ship, who will display samples, and take orders for goods.

SIR EDWIN CHADWICK delivered an address recently, before the Sanitary Institute of Great Britain, which contains several interesting suggestions. In general, he agrees with Dr. Richardson in thinking that "cleanliness, practised in its entirety, would banish all disease from the world," but he believes that mankind has another enemy besides dirt, in the shape of dampness, which will destroy even clean people if it gets a fair chance at them. In illustration of this, he quotes again from Dr. Richardson, who says that in a row of twenty new houses in suburban London, which were occupied so soon after completion that the condensed moisture stood on the walls and mirrors, he was called to two fatal cases of consumption in one family, while, within two years after the houses were finished, there were six more cases of consumption in them and fourteen of acute rheumatic fever, and comments upon this by saying that in new settlements, upon undrained land, one-half of all the children die before they are six years old, while experience has shown that the simple subsoil drainage of the land reduces by one-half the annual death-rate from consumption of the drained district.

THE AMERICAN SCHOOL AT ATHENS, AND DELPHI.

A FOUNDATION FOR THE ENCOURAGEMENT OF STUDY AND EXCAVATION ON CLASSIC GROUND.



Belfry at Ghent. From *Architektonische Rundschau.*

THE American School was not the first foreign foundation for the promotion of higher learning to be established in Greece. It was preceded by the well-known French School, instituted in 1846, and by the German Archæological Institute, opened only in 1874, but having already a most creditable record, not only for the advancement of literary work, but as a centre from which a new light has been shed upon the methods and achievements of Greek architecture. It was the excellent original work of these two schools, and, above all, their evident vivifying influence in France and in Germany upon every ramification of the study of Greek antiquity, which led the Archæological Institute of America, under the enlightened guidance of Charles Eliot Norton, to open in Athens, in 1882, the American School of Classical Studies.

The aims and immediate hopes of the founders of our School were modest. The first American exploring expedition upon Classic soil — that to Assos — was still at work; and while the successes achieved there were of a character to change the doubting hopes of the promoters of that expedition to pride, and to give America a place in the honorable annals of the history of Greek architecture and civic institutions, it was not expected that the new American School could become at once, like its French and German predecessors with their prestige of high achievement and of Government support, a centre of advanced original research.

The results have shown that the founders of the American School were unduly modest. In its seven years of existence, despite the inherent difficulties of cramped resources and the ensuing imperfection of organization, the American School has done work which has won for it the respect of the learned world. Dr. Sterrett's arduous explorations in Asia Minor have enriched the formerly scant geography and epigraphy of a wide region; at Thoricus and at Sicyon, our School has made valuable contributions to knowledge of Hellenic theatre structures; at Icaria, in Attica, Professor Merriam in a brilliant campaign two years ago, restored to the world the cradle of the Dionysiac cult and of the drama — the birthplace of Attic comedy and tragedy, from which the theatres of all the world have sprung. Ground has been broken, too, on other Classic sites, as Anthedon and Thisbe, in Bœotia, and at heroic and martyred Platæa, where there is promise of fruitful historic and architectural gains during the present season. And the chance is now open to our School, provided it can secure the necessary money, to excavate the almost virgin soil of Delphi — a site more rich in glorious associations and in promise of material results, than has been or is any other in the ancient world, with the sole exceptions of Athens herself and of Olympia. Of this, more below.

A brief statement will be appropriate here of the organization of the American School, and of the opportunities it offers. The School occupies, since 1888, its own building, of which we print plans and perspective in this issue. The building was designed by Mr. William R. Ware in most harmonious lines and proportions, and with the modest simplicity of decoration fitting in the presence of the unapproachable monuments of the Acropolis. The construction cost upwards of $30,000, and is entirely paid for. Within, the building is thoroughly adapted to its purposes. It contains the library, the usual place of assembly for the School, a beautiful, light room about thirty feet square, and beneath this a number of rooms for students, and in the basement conveniences for photographic work. Independent of the library wing is the main building, about fifty feet square, with a fine entrance-hall and monumental staircase, the large drawing-room and the study, and an ample suite of living-rooms for the Director of the School. In the upper story there are two open loggias for summer and winter use, and the flat roof, fitted for awnings, affords upon occasion a delightful place for enjoying the view and air. In the effort to make this building a credit to American architecture, many well-known American makers and designers took the most lively and liberal interest. Thus, Messrs. J. B. & J. M. Cornell presented the iron staircase, extending from cellar to roof; the Hopkins & Dickinson Manufacturing Company gave all the hardware required for the building; the Sanitas Company gave plumbing-fittings; Messrs. A. H. Davenport & Company and Messrs. Norcross Brothers, handsome mantelpieces for the library and the dining-room, respectively; the Belcher Mosaic Glass Company and Mr. W. J. McPherson, decorative panels for the outer door, and a beautiful window for the staircase; Mr. E. H. Kendall, a mantelpiece for another room. Other friends of the School have made other useful gifts; one gentleman provided for the fitting of outside shutters to all the windows, and Professor Farnum gave a generous sum for grading and enclosing the School's land. This land, of about an acre and a half in area, on high and healthy ground on the slope of Mount Lycabettus, commands an extensive and beautiful prospect over mountain and sea — from Hymettus over the Ægean, with Ægina and the mountains of Argolis, and the Saronic Gulf, to Salamis. The Acropolis stands out boldly in the middle ground. The land is a most munificent gift from the Greek Government, and adjoins the plot similarly given to the British School, which has been founded in part owing to our example, and with which our School enjoys the most friendly relations.

There is gathered in the School library, for the convenience of our students, a collection of books numbering already over two thousand, all carefully selected to meet immediate needs, and including, besides a complete set of the ancient classics, the archæological periodicals and the standard works on architecture and antiquities. It is the intention of the Managing Committee to keep this collection up to date.

Since last year the School has been placed, for a term of years, under the direction of Dr. Charles Waldstein, the brilliant New York critic of ancient art who has won for himself a high place among the instructors of English Cambridge, and whose criticisms take their rank, in Germany, beside those of the famous Brunn and Michaelis. Dr. Waldstein's enthusiasm for his work is contagious, and cannot but have the most excellent effect upon the *morale* of our students. Prior to last year, the School, from its opening, had been in the charge of a college professor, the new incumbent being sent out every year from one of the nineteen of our chief colleges which, by their coöperation and small annual contribution, have supported the School pending the collection for it of a permanent endowment-fund. Among these annual directors have served such men as Professors W. W. Goodwin and Frederic Allen, of Harvard, Lewis R. Packard and F. B. Tarbell, of Yale, Martin L. D'Ooge, of Michigan, and A. C. Merriam, of Columbia. This feature of the working together for a useful end of so many of the most prominent colleges has been one of the most valuable parts of the scheme, and while the annual change in the head of the School has been disadvantageous as militating against continuity, in other ways it has obviously been of great benefit, not only as bringing the students into relation with the best professional talent of the country, but from the inspiring effect upon the professors themselves of a year's residence in the atmosphere and amid the ever-living memorials of the race to whose achievements their life-work is devoted. The establishment of the permanent directorship removes what ground for criticism there may have been hitherto on the score of lack of consecutiveness, and the very great advantages of coöperation among the colleges are still to be retained by sending out each year from among their professors an Annual Director to work with the titular Director in the conduct of the School.

The School has had already the services of eight professors as annual Directors, who now, in six colleges scattered from Michigan to Massachusetts, are conducting their classical courses with increased fruitfulness, since the unescapable spell wrought by a prolonged stay in Athens has deepened and broadened the understanding of even the most accomplished. The School has sent out, up to now, thirty-three students, of whom twenty-four are now consciously or unconsciously sowing broadcast the seeds of the true Hellenic culture in the minds of our American youth, as tutors, instructors, or professors in colleges, or as principals or teachers in schools, from Massachusetts to Dakota and from Maine to Texas. Thus is being fulfilled with an efficacy almost unhoped for at so early a day the most useful end of such a school — the dissemination in our new civilization, the implanting in the minds of hundreds of young Americans in East and West, in North and South, of the rich intellectual leaven of Greece — of the cult of all that is eternally wise and true and beautiful, as distinguished from the local and ephemeral. Four others of our students are still studying with a view to becoming instructors. Another is a practising architect, — for the American School is open freely to all who are prepared to profit by its advantages, whether they are Classical scholars, or architects, or artists.

The School still lacks about half of the fund of $100,000 fixed as the necessary minimum for its permanent endowment. When this has been secured, the larger and assured income will make it possible to extend its activity in many ways. Though much has been accomplished, the managers of the School are anxious to do more as soon as they are enabled so to do by more liberal resources.

A word has been said above of the opportunity to excavate Delphi, now offered to the American School by the Greek Government. To allay any possible misapprehension on the ground of a prior claim of France to the honor of this work, it is proper to say that the Americans have respected the French claim fully, and have done nothing to obtain the concession for themselves until, owing to a political disagreement between the governments, France had lost all chance of securing it. France is now, through no fault of ours, out of the race. An unparalleled opportunity is open to us, under an official offer made by Greece, if we can secure by the end of December the $80,000 estimated necessary for the expropriation of the village of Castri, which now covers the centre of the ancient site. Of this sum, about a quarter is now at hand; Chicago and Boston have practically pledged each about another quarter, provided the remainder is obtained. It is looked to New York to furnish the balance; and if New York or citizens elsewhere will raise in time the moderate sum still lacking, America will have the credit of undertaking the greatest archæological work still remaining undone. That the French would have done this work admirably well there can be no sort of doubt. It will be our pride to show the world that America is prepared to carry through with equal honor a task of such magnitude.

With the story of Delphi all are familiar. From the earliest sure ground of history, its sanctuary of Apollo was revered by the ancients as the central point of the world. The inspiration of the Muses hovers around the holy waters of its Castalian fountain. In its Amphictyonic Confederation, the independent States of Greece came nearest to constituting a united nation; it formed for many purposes a federated republic. For century after century its prophetic oracle of Apollo was the most venerated religious seat of civilization, and the enormous influence of this oracle was exerted, with only minor deviations, to guide men and States in the paths of justice, and moderation, and enlightenment. Delphi naturally became a notable centre of monuments of architecture and art. Besides its great Doric temple of the Pythian Apollo, with the severe and majestic forms of the closing archaic period, inscribed with the precepts of the seven sages, bearing on its architrave the Persian shields from Marathon, and enriched with all that the sculptor and the painter of the noblest period of Greek art could give, there were stately temples of Athena, of Gaia, the Earth Mother, of Bacchus, of Aphrodite and many others, besides countless minor shrines: there was the Lesche, or public hall for assembly, painted with scenes from Homer by Polygnotus; there were the senate-houses of the Amphictyons and the Delphians, besides theatre, stadium, gymnasium, among many such foundations; there was a long series of treasuries of the different Greek States, in which, as at Olympia, were collected precious offerings made to the god in gratitude for his aid in time of battle or other danger; there were stoas or public porches, such as that built by the Athenians with the booty won by their early successes in the Peloponnesian War; there was the famous golden tripod offered from the Persian spoils at Platæa, of which the mutilated bronze serpent-base still survives at Constantinople; there were memorials of Artemision and Salamis, and of those sadder triumphs of Greeks over Greeks; and everywhere there were numberless statues of gods and heroes, of athletes and private citizens, and inscriptions commemorating the deeds, public and private, of every State and city to which the Delphic name was sacred.

Delphi has been plundered again and again — by the old Greeks themselves, by the Romans, Nero alone taking away 500 statues, by the Christians, after the oracle of Apollo had become forever silent, and by barbarians. Yet, though all the precious metals and a great proportion of the most notable sculptures have certainly gone, it is sure that very much must remain,— that there await the spades of our explorers a rich store of fragments of architecture illustrating some of the most famous buildings erected throughout the development and the perfection of Greek civilization, a part, at least, of the heaviest and least easily transportable of the 3,000 statues mentioned by Pliny, a mass of inscriptions which must bring new light upon every phase of Greek history and archæology, a great accumulation of minor antiquities, buried within the precincts of the sacred enclosure itself, or beneath the surface of the series of terraces and ravines below.

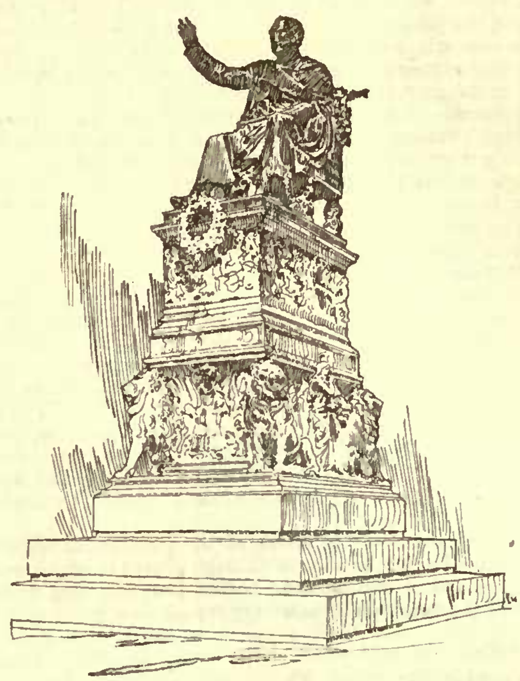
Times have indeed changed since the stupendous figure of the light-god Apollo, sheeted in flashing lightnings, in defence of his chosen sanctuary whelmed the terror-stricken hordes of Gallic plunderers led by Brennus, beneath the crashing crags of Parnassus. For centuries this sacred fountain-head of literature and art, of political advance and of religious faith, has been desolate — abandoned by the stately ceremonial processions sent at intervals in pomp and pageantry, according to its power, by each confederated State, by the teeming multitude of votaries of the god of all light and enlightenment, of contestants in the famous games, of maidens dancing and singing in the choral rings of Dionysos, of simple sight-seers, who filled with life its streets and groves, and its slopes looking out over the fair expanse of the Corinthian Gulf. The site remains practically untouched since it was abandoned by antiquity. Centuries of neglect and disintegration have buried almost completely the proudest shrine of ancient Hellas, and at the same time have preserved what remnants of it may be left for the instruction of our appreciative age. The clustering houses of the modern village, with their olive-yards below, while impeding exploration, have served a good purpose by delaying it until it could be undertaken on a scale and with scientific methods adequate to the importance of the task.

The Archæological Institute of America offers to guarantee the cost of prosecuting the work of excavation during a term of years, provided the money is raised now to buy out the villagers of Castri.

It would be dishonorable to America to permit this magnificent and unique chance to slip by for lack of sufficient interest to contribute a few thousand dollars.

THOMAS W. LUDLOW.

THE SANITARY DISPOSITION OF THE DEAD.[1]



IT is now very widely admitted that one of the most unsanitary customs which has ever been practised is that of placing dead human bodies in the ground, there to gradually decay and poison the air, the earth and the water, the three elements upon which the living subsist. Indeed, sanitary science has long proclaimed against the time-honored custom of committing the dead to Mother Earth, and leaving to unaided nature the process of resolving the complex compounds constituting the human body to their simple elements, which processes of organic decay are dangerous in the highest degree to the health and lives of the living.

Says Sir Henry Thompson: "No dead body is ever placed in the soil without polluting the earth, the air and the water above and around it." But what would he and other scientists say of the placing of three or four putrefying bodies in the same grave, covered with but two to four feet of soil, and thousands of such graves upon a few acres of ground?

Many of the old burying-grounds of Europe have received so great a number of human remains as to raise the top-soil from one to four feet above the surrounding ground. Many of such burial places have been the fruitful source of epidemics and devastating plagues, which have well-nigh depopulated the regions about them. Notable among these was the Cemetery of the Innocents, at Pari , the ground of which had been so filled with buried dead as to raise it some three feet above its normal level. The result was the breaking out of a terribly devastating plague.

Bascom relates that when the parish church in Winchinhampton, England, was rebuilt in 1843, the earth was removed to change the grade, and the superfluous black earth of the cemetery surrounding it was disposed of for manure and spread upon the adjoining fields. The result was the breaking out of an epidemic of measles, scarlet fever and various malignant skin eruptions, and the population was nearly decimated. Many similar cases are facts in local histories.

The old English burying law required that but 135 bodies should be buried in an acre, and only one body in a grave. But, in practice, that number has been exceeded ten times over; indeed, almost indefinitely. In many of the cemeteries of this country, the placing of three or four bodies in one grave, opening it again for each new-comer, is coming to be no unusual thing; warning us that some of our cemeteries are even now well on the way to those conditions which have caused such widespread horrors in other lands. Even beautiful Greenwood, now holding well on towards 300,000 putrefying human remains, is said to be guilty of this reprehensible and outrageous practice.

Recent scientific discoveries have proved that the germs of many infectious and contagious diseases retain their vitality and the power to spread the malady in the grave and in the earth surrounding it. Yellow fever, cholera, small-pox, splenic fever, scarlet fever, diphtheria and other contagious diseases can be thus communicated many years after the burial of the dead.

The outbreak of cholera at Modena, Italy, in 1828, was shown by Professor Bianchi to be due to the upturning of the ground of

[1] Extracts from an address by Dr. C. A. Harvey, of New York, before the Franklin Institute, and published in the *Journal* of the Society.

burial-grounds in which victims of the plague had been buried three hundred years before.

Dr. Freire examined some soil from a cemetery in Brazil where victims of yellow fever had been interred. Some of this earth was dried and placed in a cage containing a guinea-pig. The animal became ill, and died within five days. Upon dissection, all the tissues presented the characteristic changes which yellow fever brings about, and the brain and intestines were stained yellow by the infiltration of the coloring matter of the cryptococci.

When the *soil* is infested with bacteria or specific disease germs, mephitic gases, also, of the most poisonous character are passing through the soil and escaping into the atmosphere. Experiments prove that these gases will rise to the surface through eight or ten feet of earth, and that there is practically no limit to their power of escape. While ammonia and offensive putrid vapors are all given off from bodies decomposing in graves, carbonic acid, which makes cemetery gases so dangerous, is the largest product.

Dr. Playfair affirms that "the importation of graveyard gases entering the blood produces fever; communicated to the viscera, it gives origin to diarrhœa, and may be the cause of consumption."

Already the pernicious effects of 2,000 acres of cemetery grounds in and around Brooklyn are very manifest. The westerly winds sweep those plague-spots of corruption and bear their poisonous gases and germs of typhoid fever and diphtheria to the city of Flatbush, making that the most unhealthy community contiguous to the great metropolis, and swelling the death-rate to its present alarming proportions. This is only what exists under like conditions elsewhere. According to the report of the French Academy of Medicine, the "putrid emanations of Père Lachaise, Montmartre and Montparnasse have caused frightful diseases of the throat and lungs, to which numbers of both sexes fall victims every year." "Thus a dreadful throat disease, which baffles the skill of our most experienced medical men, and which carries off its victims in a few hours, is traced to the absorption of vitiated air into the windpipe, and has been observed to rage in those quarters situated nearest to cemeteries."

Time will not now permit me to speak of the pollution of underground water-courses by the percolation through graves in which are the oozings from coffins of decomposing bodies, thus infecting wells and streams, or of the pollution by cemetery sepage into water-sheds from which large cities draw their supplies, as the Croton watershed, in which there are said to be eighty-three cemeteries, large and small, rendering the water wholly unfit for any domestic purposes whatever. That a great sanitary reform in the disposition of the dead is a most important and urgent necessity is too evident to admit of question. Then the practical query which follows this concession is: "What shall be the *nature* of that reform, and *how* shall it be secured?" Its *nature* must be perfectly sanitary, and so appointed and employed that no contamination can occur to either air, earth or water.

Now I am aware that a considerable number are ready with the suggestion that "Cremation is such a method." But let us look at it candidly, and apart from any prejudice we may have for one particular hobby. It is the opinion of eminent jurists that, should cremation threaten to become a prevalent method of disposing of the dead, inhibitory statutes would need to be enacted because of its destruction of evidences of crime, either by poisons, malpractice, assaults or violence of any kind.

Again, suppose cremation were adopted as the prevalent method, and crematories were provided with capacity equal to the burning of all the dead, New York, with its suburbs, has about 70,000 dead bodies to dispose of annually, nearly 230 bodies daily, which, if the bodies average 100 pounds each, is equal to 7,000,000 pounds of "green" human flesh to be disposed of annually, or some 30,000 pounds daily. Burn those bodies, and the air will be filled with stenches so intolerable that the community would not be long in voting cremation an intolerable and unendurable nuisance, and anything but a sanitary method of disposing of the dead. When Abraham buried Sarah in the field of Macphelah the question of sanitation was not raised. But when, in 1843, Chadwick and his associates began in London their investigations and exposures of the very unsanitary manner in which the dead of that great metropolis were disposed of, the question of sanitation was raised in so emphatic a manner as to compel public attention and secure the enactment of statutes which provided for vastly better sanitary regulations. So, when at Washington, Pa., at Fresh Pond, L. I., or anywhere else, but three or four bodies are burned in a month, the question of the sanitary effects upon the atmosphere may be scarcely thought of. But the sanitary problem would be greatly changed were all the dead of great populous communities to be burned. Here is a practical difficulty which we have never seen discussed, and for which we know of no absolutely practical solution. That cremation, to a limited extent, and as far as it can be purely sanitary, is infinitely to be preferred to inhumation from a sanitary point-of-view, no one can deny. But there are practical obstacles, both legal and sanitary, which are very serious; and there are, also, obstacles to cremation of a sentimental character which are little, if any, less serious. This brings me to speak of a method against which lie none of the obstacles or objections which are insuperable to the other methods. I refer to a process of *desiccation* of the dead in a finely-appointed mausoleum building provided for that purpose. It is a process which is faultlessly sanitary, and, therefore, meets all the requirements in that respect that the most enthusiastic advocate for burning can demand. It provides as no other disposition of the dead has ever provided for meeting and fully gratifying that tender, loving sentiment respecting the treatment and disposition of the dead which is so universal.

The sanitary advantages and perfections of this method are secured by the application of advanced science in the use of appliances and in the manner of construction. Magnificent mausoleum buildings, much more grand and elegant than any the world has ever before seen, are provided with a large number of sepulchres, which are formed in concrete and arranged in tiers and rows, not wholly unlike the arrangement of the spaces in a safe-deposit bank. The sepulchres have one opening, which fronts a corridor, for admitting the body; and, when that is placed within, a plate-glass front is hermetically sealed into that opening, and this is again covered with a marble or metallic shutter or door and made secure.

There are conduits formed in the concrete which bring dry air into the sepulchres at one end, and others which take it out at the opposite end. The air, as it passes out, is no longer dry, but is laden with gases and moisture which it has absorbed from the bodies, and is now borne through conduits to a furnace, located in an annex, where it passes through the fire and is purified; so that no deleterious gases or offensive odors can ever escape into the atmosphere. The air which is drawn into and passes through the sepulchres is first rendered anhydrous in a large drying-room, into which it is forced, and from which it is distributed to the sepulchres, where it absorbs the moisture from the bodies in its passage.

By this process a steady current of dry air is pouring into and through the sepulchre, and doing its work most efficiently on its way. The greedy avidity with which dry air seizes and absorbs moisture is known and realized by very few. When a moderate current of dry air envelops a human body in an air-tight sepulchre, constantly drawing the moisture out of the body and bearing it away, the dry air flowing in as the moisture-charged air and gases are drawn out, the process of desiccation goes steadily on until it is finally accomplished, in from two to five months. After the work of desiccation is finished the air-conduits are closed. As dry air only can be in the sepulchre when it is closed, and as the sepulchre is hermetically sealed, and, therefore, atmospheric air cannot reach the now desiccated body, oxidation cannot be expected to ensue. There the body will repose in security and sweetness until the sounding of the resurrection trump.

The fact that by this process the moisture and gases extracted from the body are borne to the fire and cremated, and that, as the process is slow, the deleterious gases and vapors pass to the furnace in small quantities at a time, and are consumed with the utmost ease and safety, it is thus made the best *sanitary* disposition of the dead.

Again, it is claimed indisputably that bacteria, microbes and disease germs of every name live, thrive and propagate in connection with moisture; and that, deprived of moisture and subjected to dry-air conditions only, they cease to exist or are entirely innocuous.

Dr. Sternberg, general director of the Hoagland Laboratory, says: "The cholera *spirillum* is destroyed in a few hours by desiccation. The typhoid *bacillus* takes a longer time, but exposure in a dry condition to oxygen is one of the most effective ways of destroying this and other pathogenic germs." So that, if all the germs of disease are not entirely borne away with the moisture and gases and consumed in the flames, and should any remain, they are destroyed quite as effectually by the dry air in the sepulchre, which is hermetically sealed; thus again rendering this a thoroughly sanitary method of disposing of the dead.

Permit me to say, in conclusion, that the plan for the desiccation of bodies in a new mausoleum provides for great economy of space in disposing of the dead, rendering one acre of ground equal to thirty-five acres for cemetery use; provides for the most respectful and kindly care for the dead for all time; for perfect security and protection for the bodies placed therein; for guarding against entombment alive; preserves the remains for future removal or for medico-legal examination; provides a home which is equal in elegance to any princely mansion of earth, and vastly more enduring, in which the dead may repose without being disturbed; and, in addition to all these other advantages, its sanitary provisions are perfect, lacking nothing; thus making it the best method for the sanitary disposition of the dead.

ZINC AND BRICKWORK. — Recent experience in Germany points to the fact that under some conditions sheet zinc, when in direct contact with brickwork, suffers from rapid corrosion. It appears that in building the Berlin City market halls some sheet-zinc work which rested upon brick walls was deeply pitted at a number of places, and particularly where the metal was in direct contact with the bricks. Chemical examination of these showed that they contain as high as 1.14 per cent of soluble salts, capable of producing the destructive effects noted, and stimulated to more energetic action by moisture. The proportion of such salts will vary with different kinds of bricks, and in some there may be nothing to induce such corrosion as that here noted. It would be an advisable, and, in the end, a cheap precaution to avoid immediate contact of sheet zinc and brickwork by inserting a layer of roofing-felt or similar material.

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

THE FISKE BUILDING, STATE ST., BOSTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued only with the Imperial Edition.]

COMPETITIVE DESIGN FOR GYMNASIUM FOR BROWN UNIVERSITY, PROVIDENCE, R. I. MR. HOWARD HOPPIN, ARCHITECT, PROVIDENCE, R. I.

THESE plans were made in accordance with the following requirements: —

The building is to be of brick with either terra-cotta or stone trimmings. It is to contain a gymnasium with the usual appliances; running-track, rowing-machines, etc. It is to have two dressing-rooms with 200 lockers and room for more if necessary. Shower and sponge baths and a dry-room with four or five baths; two private rooms for the Professor; billiard-room with three tables, bowling-alleys, three if possible. Cage for baseball practice, sparring-room, a piano, water-closets, three or four rooms for repairs and supplies and for the janitor; large swimming-bath if possible. The cost was estimated as follows: —

Mason work (including drains)	$10,160.00
Carpenter work (including painting and trimming)	15,250.00
Plumbing work	2,000.00
Gynasium apparatus (including lockers)	5,000.00
Furniture	1,000.00
Grounds	500.00
	$35,910,00
Extra for additions, etc	4,090.00
Total cost	$40,000.00

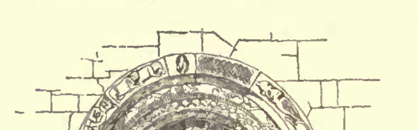
THE OLD RIDER FARM. SUMMER HOME OF MR. C. A. RICH, ARCHITECT, BELLPORT, L. I.

SEE description elsewhere in this issue.

TWO INTERIOR VIEWS IN THE SAME.

BUILDING FOR THE AMERICAN SCHOOL AT ATHENS. PROF. W. R. WARE, ARCHITECT, NEW YORK, N. Y.

A SYSTEM OF CONCENTRATED RESIDENCE.[1]



DOOR·OF·THE·CHAPEL·OF·THE·CHÂTEAU·TYROL AT·MERAN·AUSTRIA

IN 1877, I had the privilege of reading a paper before the Congress of this Association, in which I stated that I thought I had discovered the cause of what I held to be the Worst Evil of the tenement-houses of New York, Brooklyn, Jersey City, etc., *viz.:* the general prevalence in them of dark and close sleeping places, of bedrooms having no windows to the outer air.

This evil had its origin I found in the street and lot system adopted in those cities, a system which prevents the subdivision of land into small lots, because allowing of no means of access to them. While small lots, as we see in Philadelphia, allow those of small means, such as constitute the majority of heads of families, to own their own homes, the impossibility of procuring such lots in New York, for instance, leads to the building, on the large lots alone procurable, of such large houses as alone pay on such large lots, and to making such houses pay better, by letting the separate floors, or parts of floors, as tenements.

I felt that this view ought to be made known as widely as possible, so that other places might happily by such knowledge be prevented from adopting the street and lot system which, in New York, had lead to the tenement-house, and to the tenement-house's worst evil.

I believe the view then presented has gradually gained ground in New York, but I do not know of its having received attention, or influenced action, elsewhere.

At the same time that I presented this view, I also prepared a plan for avoiding the evils of dark, airless bedrooms in future tenement-houses; since tenement-houses, owing to the prevalence and extent of the existing street and lot system, would still have to be built. I pointed out that, by building tenements never more than two rooms deep, both front and back rooms would, of course, have outside light and air; while repeating such a building toward the rear of the lot, the two buildings together would make full use of all the lot, and give the same accommodation as one large building, yet that all the rooms would have the same advantage of windows to the open air.

Again, I showed that if, further, the rows of buildings thus planned were, instead of running east and west, placed running north and south, the air-spaces between them would run through from street to street, and, if the ends of those spaces were left open, would give free passage to currents of air at all seasons; and so, too, free passage, on most summer afternoons and evenings, to the delightful sea-breeze which, when not shut out, makes a home in New York often cooler at night than one in the surrounding country.

Hearing of this paper, read in 1877 before this Congress, the editors of the *American Architect and Building News* wrote to me for a copy of it for their periodical; and the substance of the paper, with some added matter, was published in the *American Architect and Building News* during the year following, in a series of articles, under the title of "Urban Housing."

Subsequently, a meeting of philanthropic persons in New York resulted in the offering of a prize for a plan for a tenement-house, which, in the judgment of this committee, might be deemed best fitted to insure an avoidance of New York tenement-house evils. But my view of the cause of New York's worst tenement-house evils had made so little impression that those interested in the matter restricted the plans allowed to enter the competition to plans confined to a single house on a single lot, such as I held to be the cause of the evil; and the result was that the plan which received the prize, though a great improvement on the majority of tenement-houses then existing, showed each tenement with one of its three rooms totally without outside air or light, and another of its three rooms only very imperfectly lighted and ventilated from a well, or small close-bottomed court; and thus this prize-plan still embodied what I had felt to be the worst evil of the New York tenement-house system, the fruit of the New York street and lot system.

However, the action of this Committee, and the difficulty of finding any one at once with the capital and the disposition to carry out a plan covering several lots, united to the counsels of a philanthropic friend, led me later to devising a plan for a single house on a single New York lot, affording the same number of tenements on a floor as the prize plan, and with the same number of rooms to each tenement, but giving to every room direct light and air by its window opening into the open air.

This plan was published in the *American Architect and Building News*, September 27, 1879.

But in order to carry out this plan, I believe I proposed an arrangement which would be a violation of another New York civic enactment—one equally well intended with the New York street and lot system, but like that, by reason of its inflexibility and its inadaptation to a variety of cases, beneficient in its intentions, but maleficient in its results. The misery and loss, and harm often resulting, and indeed more likely than not always to result, from hasty and ill-considered, and above all restrictive and inflexibly restrictive legislation, was thus brought home to me again instructively.

I felt, however, that the needs of men in general to forms of Concentrated Residence, which should afford the advantages and economy in living of a high degree of Concentration of Residence, without attendant evils, was not confined to cities suffering from hampering civic enactments like those of New York. And again, that even in New York a capitalist or a combination of capitalists, might yet be found to carry out a plan for improved tenements, requiring several lots. And this whether from philanthropic motives, or philanthropic motives combined with hope of profit, or solely from hope of profit. For I felt that the better the tenements, the better the rents, as we now see in the case of costly apartments and dwellings. Later, learning that a friend had bought, out and out, an apartment in a palace at Venice, I began to conceive of co-operative building associations which would build such improved tenements for members of the association owning separate tenements, a system which has since become common in the more costly apartment-houses. Nor did I think of New York only and its adjacent cities in this connection, but of all places now and in the future where men might want the advantage of the convenience of a high rate of Concentration of Residence combined with an absence of attendant evils.

Thus working, as constantly as new light and new solutions of difficulties presented themselves, I have evolved a system of Concentrated Residence, of which I would ask the privilege of giving on this occasion some account.

This system is equally applicable to all countries. At the same

[1] The table printed in our issue for August 10 last, was presented with this paper at the recent Convention of the American Social Science Association by its author Mr. E. T. Potter, and our readers are referred back to it.

time I have felt that buildings avoiding the special evils of New York tenement-houses, yet giving the same high rate of Concentration as they, were most needed in New York. Illustrations of the system suited to New York lots have therefore been worked out and published in the *American Architect and Building News*, October 15, 1887, and May 5, 1888.

Further, I have prepared a comparative table showing wherein this system differs from all preceding systems.

By this system I have shown can be secured in New York and other cities afflicted with the evils of the usual tenement-house system, buildings giving the same accommodations as they, yet securing direct light in every room.

CATHEDRAL FOR NEW YORK.



Belfry at Ghent. From *Architektonische Rundschau.*

THE publication of six of the competitive designs by American Architects for the great diocesan church of St. John the Divine[1] deserves something more than passing notice, and the fact that a number of British architects of repute entered the lists imparts additional interest to a project of unusual scale and magnificence. With the exception of the Memorial Church on the heights of Montmartre, no ecclesiastical edifice of like importance and of such contemplated grandeur has been projected for many generations, and if the committee in charge of this undertaking should decide upon carrying into execution any one of the more favored designs, America may boast of a structure which, in point of scale at least, will vie with the great cathedral churches of Seville, or Milan, or Cologne. Restrictions as to cost, which so seriously hamper the architect in ordinary competitions, formed no part of the instructions, and consequently many of the designs indicate a piling-up of materials, with a view to attaining tallness, neglecting the more satisfying requirements of scale or of refinement in proportion.

The ingenuity of many American architects in the designing of mercantile buildings and storehouses, and the conspicuous success which has attended some of their recent efforts to break away from the traditions that fetter the nations of the Old World, favored the supposition that, in a competition of this kind, almost untrammelled by restrictions, some new departure from the recognized rules that underlie the arrangement and design of a great diocesan church would be the immediate result. If an opinion can be formed from a study of these six published designs, it is not unreasonable to say that a great opportunity has been lost and that architectural art, as represented by these designs, will be no gainer by the erection of a monster cathedral on the outskirts of New York City. The ill-success that attended a recent and somewhat similar project for Liverpool is likely to be repeated here, and for the same reason. A competition for a costly monumental work should only be undertaken after well-matured consideration of every possible requirement, and such questions as type of building and the main points to be observed in the general planning of the structure should be determined prior to the publication of the scheme. The instructions were restrictive in many essentials where latitude should have been allowed, and undefined where a series of reasonable restrictions would have assisted rather than impeded the architect in working out his design. Whether national religious sentiment, rather than a craving for a tall cathedral by a people of everyday tall ideas, was the underlying motive in this undertaking, is open to doubt. A cathedral in the older Christian communities was of spontaneous and continuous growth down to the time of the Reformation; the form and purposes were clearly defined and adapted to each successive generation, and the style, keeping pace with those requirements, remained practically unaltered for more than four centuries. The spirit that animated these builders of cathedrals during this long period still exists. It has kept alive, markedly in this country, the love of Gothic architecture in association with Christian worship. Revolutions and political disturbances in other countries in Europe have snapped the links that bound the New World with the Old, and consequently mediæval architecture has lost its hold where it might have flourished and achieved higher ends. What is there in the United States akin to this sentiment? The earlier settlers were Puritans. The form of their sacred edifices was that of a conventicle. The purposes were for the hearing of the preachers. The style was something approaching to a modern music-hall. The form, the purposes, and the style, imported nearly three centuries ago, are still in keeping with American sentiment; and ritual, more in harmony with Puritan thought than with any of the later developments in our own country, gains rather than loses by being American and not Anglican. And here it may be observed that Gothic architecture never took root in the United States. The Old church as it is called, in the Broadway, erected some fifty years ago, has never proved a source of inspiration to American architects, and the most successful of modern churches in the States, of which Trinity Church, Boston, is a conspicuous example, have little in common, whether in respect of planning or proportions, with the churches in any country where Gothic architecture still flourishes.

A glance at the illustrations in *The American Architect* will enable any one to form an opinion whether the designers have not ignored religious requirements in the New World, by adhering too closely to the sterner rules that have hitherto governed the building of cathedrals in the Old World. It is, perhaps, fortunate that the dimensions of the site, as regards length, restricted the competitors from a direct imitation of a French or English cathedral; and it is equally unfortunate that the dimensions of the site, as regards width, have not (at least in the six designs) suggested a treatment of a totally different kind. "A nave wide as Milan, with the perfect proportions of Westminster," says one of the competitors; "Cologne with its height retained, but other dimensions adjusted to it; and, for necessary dignity in a city with immensely lofty buildings, a central spire 575 feet high is contemplated." Of course, this central spire is the key-note to the whole structure. Dry-goods stores of abnormal height, and residential flats of twelve or thirteen stories, necessitate a tall something that shall dominate the landscape and rise Eiffel-like into the sky. "The support of the upper part of the octagonal tower," says another architect, "is upon heavy girders resting upon iron columns concealed in the stonework, and is independent of the piers and arches. The use of iron, securing sound construction, with precisely the effect sought by the mediæval architects, solves the most difficult problem presented to those masters — the construction of central towers, many of which have fallen, or could never have been completed as designed." A third competitor, whose plan of basilican type is of great excellence, sensibly remarks, in defense of his scheme of arrangement, that "if the Church would go back to the mediæval in architecture, she must go back to the mediæval in life; for she must live as she builds, and build as she lives."

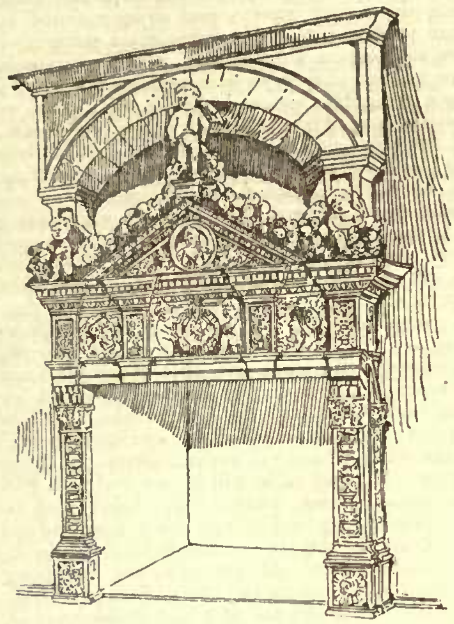
The demerits, as well as the merits, of these designs are well worthy of study, for they show how difficult it is for an ingenious people, desirous of freeing themselves from the fetters of tradition, to avoid seeking for inspiration, even in matters of detail, from the monuments of antiquity. — *Alex. Graham in the R. I. B. A. Journal.*

[1] *The American Architect*, 5th and 19th October, 1889.

BLACK PRINTS ON A WHITE GROUND. — It has always been the desire of engineers to obtain "black" prints from plans and drawings, in place of the present blue prints. The discovery of a new substance by a French chemist, M. Pechard, announced in *Iron*, may make such a result possible. It is a mixed acid derived from oxalic and molybdic acids, and is, therefore, termed "oxalomolybdic acid." The crystals of oxalomolybdic acid, when dry, may be preserved unchanged, either in sunshine or in the dark; but if moist they quickly become colored blue when exposed to the sun's rays. If characters be written on paper with the solution, they remain invisible in a weak light; but, when exposed to sunshine, they rapidly become visible, turning to a deeper indigo-color. It is curious that this effect only happens when the solution is spread over paper or other surfaces; for the solution itself may be kept unaltered in the bottle for any length of time, except for a trace of blue at the edge of the meniscus, where by surface action a little is spread against the interior glass walls. If a sheet of paper be immersed in a saturated solution of the acid, dried in the dark, and then exposed behind an ordinary photographic negative, a very sharp print in blue may be obtained by exposure to sunlight for about ten minutes. The color instantly disappears in contact with water; so that, if a piece of this sensitized paper be wholly exposed to sunlight, one may write in white upon the blue ground by using a pen dipped in water. If, however, the paper with its blue markings be exposed to a gentle heat for a few minutes, the blue changes to black, and the characters are then no longer destroyed by water. — *Science.*

EVAPORATION OF WATER IN TRAPS.[1]

EXPERIMENTS MADE AT THE MUSEUM OF HYGIENE, U. S. NAVY DEPARTMENT.



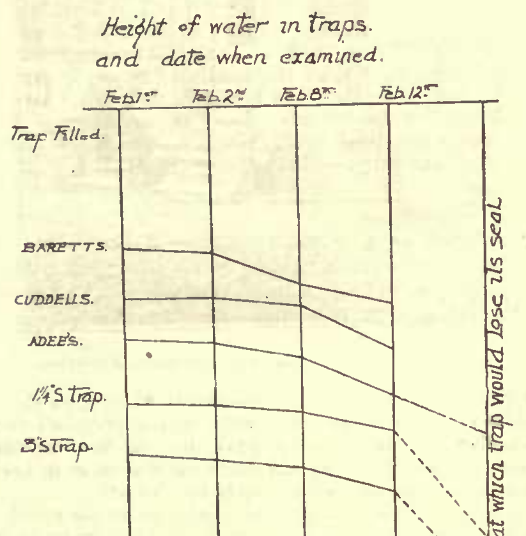
XVI Century Mantel. Hotel du Vieux Raisin, Toulouse, France.

ALTHOUGH siphonage and back-pressure are the principal causes of failure in the ordinary plumber's traps, nevertheless, water in them will evaporate and thus break their seal.

It is important to know how long they will withstand the effects of evaporation. The opponents of trap-ventilation claim that the evaporation produced by the circulation of air through the soil and vent pipes is liable to destroy the seal of traps in ordinary use. If this is a fact, it would be a serious blow to the usefulness of trap-ventilation. Mr. J. P. Putnam, some years ago, made experiments on trap-ventilation, the results of which have been extensively published. Unfortunately he made his experiment on evaporation with the same stack of pipes and carried them on at the same time that he was experimenting on trap-siphonage. Any one can see how great the opportunity was for errors and how impossible it would be for any one to judge how much of the water was taken out by siphonage and how much by evaporation.

Even when the traps were tightly plugged on the house-side, the partial vacuum on sewer-side created by a column of water passing down the pipe would cause the air between the plug and the water to expand, and who could tell the amount of water that would be forced out. And who could measure the amount of air that might pass an imperfect plug. For these reasons I consider Mr. Putnam's experiments on the subject entirely unreliable.

Some time ago I made a limited number of experiments on this subject at the Museum of Hygiene, U. S. Navy Department. These were made some time after, and entirely separate from, the



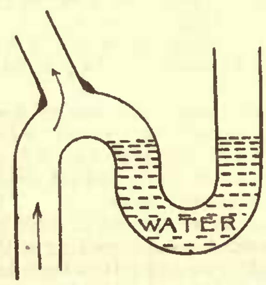
experiments which I made at the same place on trap-siphonage. Of course, the amount of water evaporated would be in proportion to the surface exposed, and the rapidity of the change of the air coming in contact with the surface. The most effective trap would be the one with the least surface and the greatest depth of seal. I experimented with five traps, Barrett's, Cudell's, Adee's, a 1¼" and a 3" S-trap, all vented. (It being assumed as a fact that a vented trap would undoubtedly evaporate more rapidly than an unvented trap.) The traps represent different areas of surface in proportion to the depth.

The small S-trap had the least area of surface and the greatest depth. To give them the severest test for evaporation, they were placed so that a strong current of heated air passed through the sewer branch of the trap and out through the vent-pipe. A stronger and more continuous current than they would ever be subjected to in an ordinary house.

The broad-surface traps lost their seal more rapidly, as was expected, than the ones with a small surface. The heighth of the water was measured at different periods, and a steady decrease was shown, being a little greater in the last four days than in the preceding six days; this was probably owing to the increased current of heated air due to a cold spell. The traps had lost the following amount of water after twelve days.

Barrett's	5/8"
Cudell's	5/8"
Adee's	3/4"—1/32"
3" S	5/32"
1¼" S	1/4"

You see that the small S-trap had lost only ¼" in twelve days, while its seal was an inch and a quarter deep. At the same rate it would have taken sixty days to break its seal with a continuous current of heated air passing through its vent-pipe to assist in changing the particles of air. I had expected under the circumstances to find the traps with their seals broken in a few days.



Is it not possible that there is a small column of air comparatively quiescent between the water in the trap and the current passing through the vent as shown in the sketch.

Although the examinations made of the height of water in the trap were limited in number, I think the results are ample to establish the fact that the ordinary S-trap vented will not lose its seal by evaporation for long periods, and if the traps are filled even once in two months it will be all that is necessary to keep their seal intact.

The experiments on trap-siphonage (read before the A. I. A. Convention held in New York) proved that a simple S-trap properly vented was safe from failure by trap-siphonage and back-pressure, while all traps unvented were liable to fail from either back-pressure or siphonage. These later experiments prove that the S-trap vent is safe from evaporation during long periods. I would deduce from the two sets of experiments, first: The S-trap properly vented is the best form to use. Second: No trap should be used without ventilation. I append to this paper a diagram showing graphically the rate at which the water was lowered by evaporation.

[1] A paper read at the recent Convention of the American Institute of Architects by Mr. Glenn Brown, F. A. I. A.

THE SUMMER HOME OF AN ARCHITECT.



Doorway at Dentzic. From *Architektonische Rundschau.*

THE older a man grows the more cranky he becomes, and, if he be a professional man, he generally will hit upon some hobby or other, concerning which he will ride his neighbor to death, but at the same time get an immense amount of enjoyment for himself.

Few men ever bought a house without wanting at once to make the lath and plaster fly in some way or other, under the impression that the former resident had a terribly uncomfortable house, which it was his duty and pleasure to improve upon. Neither is an architect himself exempt from this general rule, as you shall presently see. But, outside of the house proper, almost every man wants a place of his own, which he may dub his den, his studio, his workshop or his library. It makes no difference, however, what he calls it, for in any case it is that room of rooms which a man desires to call his own, and in which he delights to spend his time in work, pleasure or study: a place wherein he can perchance throw his coat and hat wherever he pleases, and not hang it methodically upon a certain peg on the wall; where he can recline in his favorite position upon a couch of comfort, if not of great cost, and shy his cigar-ashes upon the rugs "to keep the moths out," or pull away upon his pipe without being continually cautioned not to scent up the whole house with the horrible stuff; and, joy of joys, where the dust is allowed to find a resting-place

safe from the vigorous dust-rag of every-day house-cleaning, while a very big lock with a very small key shuts out the world at will, and leaves him to the solitude of his own thoughts if he so desire.

Call it what you please, we commenced by calling ours our barn, and ended by inviting our friends to our den.

The first name was, however, more near to the truth, for it had echoed for twenty years to the sounds of man's faithful servants, and the very timbers were redolent with the odor of hay and straw.

And this is how it came about: Many years ago, while working under the direction of one of New England's most famous architects, a barn and a paint-shop were taken as a basis, moved up to one another, and by his artistic hand changed as if by magic into a thing of beauty. An old cider-mill screw formed the newel-post to a swinging stairway outside, which, by a tackle and pulley fixed in an old ship's cat-head, allowed it to be swung up at will. A balcony was formed along the side of the barn by running the roof over, and a facetious bit of legend painted on the side of the barn warned all visitors that "Those who are tall must keep near the wall."

And, if the visitor was anything of a naturalist, he observed that the balcony-rail was formed from the vertebræ of some old whale, who, after traversing unknown oceans, had become a thing of use as well as beauty by forming the balustrade thereof. And when, after passing along the balcony, and risen a few feet over the roof of the paint-shop, one passed from another balcony into the barn-loft, behold! the old side-boards were covered with paint, and the panels between the studs became pictures from the hand of the artist, and all around were sketches which delighted the eye.

I know not whether the old studio is yet in existence, but, if it is, it will still show how much of beauty can be made out of an old barn and a paint-shop, and at no great expense either.

Becoming the happy possessor of an old farm on the outside shore of Long Island, where house, barns, ice-house, milk-rooms, sheds, wood-houses, wash-houses and the inevitable hennery and piggery had for years been treated to the booming of the grand old ocean, we cast around us to see what could be done with them.

A dilapidated old horse neighed at us as we entered to make his acquaintance, and hens by the score stalked around, picking at the grain on the floor, and cocking their heads from one side to the other with the wisest of looks.

Having obtained more valuable second-story rooms by a wide gambrel in the centre of the existing long, gambrel-roofed house, we bethought ourselves of the value of the old barn, and resolved to so metamorphize it that its old possessor would never know it should he ever make us a call. Besides, we wanted a big den, and here it was, waiting for us in the rough. So it was moved up to the house, and turned, gable on, with its roof joined to that of the gambrel. One of the old hay-lofts was taken out, while the other was left to be made into a sort of gallery, opening into the second story of the house. To hold up this balcony, heavy timber-posts had been used, under which were the stalls; but, these sticks not harmonizing very well with the interior as changed, we betook ourselves to a dealer in second-hand lumber, one of those antiquarians who tear down the works of our forefathers for those who wish to replace them with the "villa" of modern times, and whose lofts are full of old columns, mantels, doors, windows, stair-posts and Heaven knows what not, of all kinds and in every condition. From him we obtained a couple of old columns of rather predominant size when reduced in height, but yet retaining their beautiful volutes and eggs and darts. These were set in place of the timbers, and a rail to the balcony formed of simple, square balusters.

To put in large mullioned windows where the huge barn-doors stood was easy, and yet the doors were left to be closed up when we left in the winter. To sheath up the side walls eight feet high, and plaster the whole roof to the ridge was also easy, and a simple staircase of pine led to the balcony and second floor of the house, while the frieze above the sheathing up to the plaster roof was covered with jute cloth of warm tone, and held by brass tacks.

The most important feature was yet undone. A man who has not seated himself before a big old-fashioned fireplace, upon a fall or spring evening, and seen the play of the firelight, has not yet lived, and the old back-log stories are simply legends of which he knows nothing. I do not mean by this a fireplace whose opening seems to be measured by a decidedly slim purse, where small billets of wood bought of the grocer by the hundred are used, or where diminutive chunks of coal are condescendingly allowed to sizzle and snap. Nothing of the kind.

We took one-third of the whole end of the barn, and built up a big common brick fireplace opening, that allowed logs the size of a man to be rolled into it, and a visit to the village blacksmith gave us a couple of andirons which we paid for not by their skill, but by their weight. Gathering in the flue properly at the top, a large hood was built for a mantle, leaving a shelf for jugs, plaques, bric-à-brac, and also, most assuredly, a goodly quantity of dust.

Next, to light our abode became quite a formidable problem, but, having painted all the woodwork and beams throughout with white paint, another visit to the blacksmith yielded a huge iron ring about five feet across, with a heavy cannon-ball across the centre, and hung from the roof by four chains, while iron cups held the lamps. This, with the numerous candelabras around the side walls, made us a glorious illumination when required.

We happened one day to be riding around one of the enterprising little villages with which Long Island abounds, and going into the corner-store, which every town possesses, met some old citizens bargaining for some gorgeous Brussels carpeting which seemed to them to be the only proper covering for the best "setting-room" floor. And, as we watched, we found that they had brought with them a huge roll of that delightful old rag-carpeting, made in their homes during the winter months, and so appreciated by artists; this they were trading for the gorgeous, inlaid pattern, all wool and a yard wide, stiff-texture Brussels, and paying a bonus in money besides. Here was our chance, so without more ado we took enough for a rug fifteen by eighteen feet, and what do you suppose we paid for it? A ten-dollar note allowed us to carry it off to our den, while our benighted neighbors paid a ten-dollar note besides their rag-carpet, and took away the terrible stuff to deck the "setting-room," and, no doubt, considered us benighted city boarders.

After this we visited our old friend, the carpenter, who made a grand old table out of plank boards, neatly smoothed and painted white, and also some box seats, over which were to be thrown mattresses and rugs, and thus form divans which might tempt the very houries of a harem.

Well, the summer passed and fall set in: the great barn-doors were closed, covering up the little mullioned windows, the old charred back-log was covered with ashes, and little brown faces and sun-burned hands returned to the city. But at Thanksgiving a few hours will take them back for a day, the big barn-doors will be thrown open, the old back-log will be raked out and supplemented by blazing bits, and the chicken-coop will suffer a diminution in the number of its occupants. The long table will be covered with good things, and while old ocean pounds away on the beach with its anthem of grandeur, I cannot help feeling that the den will furnish a magnificent place to spend the day, before finally leaving it to the snow and sleet of coming winter. At any rate, our barn-house becomes a home of much comfort, where the cares of the world, the flesh and the devil, together with the fret of a busy professional life may be thrown to the winds of the Atlantic, and exchanged for the quiet and restful influences of our old den. C. A. R.

DOMES AND TOWERS.[1]



Doorway at Dantzic. From *Architektonische Rundschau.*

THERE are no feature of architecture so pleasing as domes and towers. However beautiful may be the porticoed entrance; however bold the projected pavilions; or however varied or extensive the façade, the eye will single out the dome or tower and with instinctive pleasure follow it up to the summit.

Though domes crown the grandest buildings in the world, I must confess that I never look on a dome with the same degree of satisfaction that I feel when looking on a tower.

No matter how much I may assume that all the necessary consideration has been bestowed on the principles governing domical construction, its theory of equilibrium and lines of gravity, yet am I unaccountably possessed of the idea that those gracefully swelling outlines cover a world of ingenious expedients to hide the actual construction of the towering mass, carrying on its interior so much sham work of lath and plaster, taking the form of antæ and entablatures, heavy groupings of pedestaled victories, and statued niches.

Of all the great domes that have been built in the past six centuries not one can compare with the first aerial dome, that of Santa Maria del Fiore at Florence, built in the twelfth century by

[1] A paper read by Mr. McNamara, at the Convention of the American Institute of Architects and the Western Association of Architects.

Brunnelleschi. In this alone do the outer and inner domes sweep upwards in parallel lines, springing from the same arched base, and are the actual supports for the beautiful lantern surmounting them. The nearest approach to the honest construction of Santa Maria is St. Peter's at Rome. That was modelled after it, in the fifteenth century, by Michael Angelo. Although its two domes do not run quite parallel, they well come under the weight of the lantern.

Both St. Paul's at London, built in the sixteenth century by Sir Christopher Wren, and the Panthéon at Paris, built in the seventeenth century by Antoine [Soufflot], have each three domes, springing from the same perpendicular base, but each sailing away in a direction for itself, looking as if each one was crowded down by the one above it. Both domes are outwardly beautiful, and interiorally false, from the fact that one of the three must be useless. Particularly does St. Paul's possess both of these features. And the St. Paul's of Paris, the Dome des Invalides, built in the sixteenth century by Mansard — the originator of the "Mansard roof," — is of the same class.

The cupola of the church of Santa Sophia at Constantinople, built by the architect Anthemius, is a beautiful link between the grand aerial domes I have mentioned, and the hemispherical dome of the original Pantheon of Rome. This latter had regular tiers of caissons from base to eye, and was the first step out of the brick vaults that covered all the circular temples of Pagan Rome.

The first known attempt at dome building was the tomb of Agamemnon at Mycenæ. It was formed by horizontal courses of large blocks of stone, each course projecting one beyond the other, as they rose toward the eye, the projecting courses being afterwards cut away to an even surface. Gwilt tells us that "it is the most ancient in Greece; and it is a curious circumstance that at Drogheda, in Ireland, there is a monument, whose form, construction and plan of entrance resemble it so closely that it is impossible to consider their similarity the result of accident." And on this Gwilt believes in the hypothesis of the distinguished archæologist, Geoffrey Higgins, "that these works were built by the same race of people, who were the earliest enlightened and learned occupiers of Greece, Italy, France, Britain and Ireland. And that the language of the whole western world was the same, having the same system of letters — that of the Irish Druid — the alphabet in which is written the Irish MSS."

There is a painful similarity in the outward appearance of all the domes of the world, for, when one is to be designed, St. Peter's or St. Paul's serves as the prototype. No matter how much talent the architect may command, his originality is ever environed by the outlines of those two domes. This is clearly illustrated in the case of Sir Christopher Wren, who displayed such wonderful resource in tower building, and yet, after three attempts at a dome, had to follow generally St. Peter's in outward form.

The use of wrought-iron in latticed truss and ribs relieves the architect of our day of much anxiety in modern domical construction. This manner of construction has been successfully used in the dome of the St. Louis court-house, which is as beautiful in outline as any of those I have mentioned. It is seventy-five feet in diameter and 185 feet high from floor to top of lantern. It is in the Grecian-Corinthian order. This dome has passed through quite a siege of talent in its struggles for completion. Originally designed by a civil engineer, it stood up to thirty-five years ago on a circular base, rising slightly above the abutting roofs of the four wings of the building. In outline and color it looked like an inverted pot. It then fell into the hands of a well-trained architect, who tore it down, and designed a dome in appearance and construction closely resembling the present one. But before the architect had time to carry out his well-matured study, through political influence, he was removed, and a "boss-carpenter" took charge of it. The boss-carpenter put aside the architect's drawings, and started out to be original, and succeeded. He began constructing the dome in sections of cast-iron, having a base two feet wide and a depth at the eye of twelve feet. When these sections began to kick out at the haunches and collapse at the eye the authorities got uneasy and called in an accomplished architect to investigate it. He was allowed to associate with him his brother architect who was superceded by the boss-carpenter, and the two architects made a thorough examination. Their calculations and geometrical drawings of the cast-iron sections revealed the fact that the lines of gravity passing from the eye of the dome through the sections, as put up, dropped eighteen inches inside of the foundations on the ground-floor. The boss-carpenter's castings, which cost $20,000, were condemned, taken down, and sold as scrap-iron. The dome was again started upwards, as designed by the first architect, and carried to completion by all succeeding architects. Standing in the centre of the dome you have a clear, uninterrupted view from the ground-floor to the ceiling of the lantern.

This dome is again the centre of a spirited controversy, over some fine wall-decorations by the late artist Wimer, the famous delineator of Indian scenes. He designed for four panels in the dome and painted in a beautiful manner four historical American scenes — "De Soto discovering the Mississippi," "Marquette descending the Mississippi," "The Attack by Indians on St. Louis," and "Buffalo on the Plains at the Foot of the Rock Mountains." Supporting these pictures he painted the heads of Washington, Lincoln, Benton and Bates. All of these, with numerous allegorial figures, are now fading and scaling off; and the vexed question now being agitated by the admirers of the great artist is how to preserve his paintings.

Quadrilateral vault domes, such as those on the United States custom-house, 230 feet high, and the "Four Courts" in St. Louis, are effective for outward appearance, but leave no room for interior decorations. That of the United States custom-house is a fine example, having a good base and a fine sweep, coming easily under the weight of the lantern. That of the "Four Courts" is not so good, being too depressed at the lantern. A novel feature of this latter design was four American eagles standing on pedestals at the base of the dome. They were of immense size and rapacious appearance, looking out on the street with outspread wings and outstretched necks, and hooked beaks wide open, as if about to swoop down on "a forgotten soldier." They are not there now. Tradition says they flew away upon hearing it proclaimed that a paltry million-dollar city-hall was to be built in the adjoining park. They, proud birds, the golden offspring of a munificent "county court," would not perch in front of this beggarly offering from the "new city charter."

There is more variety in the plans and dimensions of domes than in their appearance.

St. Peter's is square in plan, 139 feet in diameter and 450 feet high. St. Paul's is octagonal in plan, 100 feet in diameter, and 425 feet in height. The Pantheon, at Rome, is circular in plan, 140 feet in diameter, and 145 feet in height. The Panthéon, at Paris, is square in plan, 120 feet in diameter, and 340 in height. Santa Sophia, is elipitical in plan, 115 feet in diameter, and 180 feet in height. Santa Maria del Fiore is octagonal in plan, 138 feet in diameter, and 400 feet in height. The Dome des Invalides, at Paris, is 50 in diameter, and 323 feet in height. The dome on our own grand capitol, at Washington, is 125 feet in diameter, and 300 feet in height.

Towers preceded domes, as can be traced by the obelisks of Egypt, the columns of India, the Druidical pillars of Britain, and the round towers of Ireland. And there is more room for the originality of the architect in tower designing, as the multiplicity and beauty of the towers of the various nations can testify.

Passing by the monumental columns, which exhibit no originality after the orders became known, we halt before the wealth of fancy and inspiration found in the Gothic towers. These are chiefly confined to the great cathedrals, such as the twin towers of Cologne, over 500 feet high, building from the eleventh to the present century. The whole school of Gothic architecture is embraced in this structure. The single tower of Ulm, over 400 feet high, built in the fourteenth century, and the equally beautiful towers of Strasburg, whose great beauty is its deep panelling and bold sculpturing, giving it a play of light and shadow on a sunny day that charms the artist Strasburg, I believe, is the birthplace of the world's greatest artist, in light and dark, — Gustave Doré.

The towers of Nôtre Dame, at Paris, built in the tenth century, though not lofty, being but 200 feet high, are beautiful in detail. Mechlin can boast of a noble tower. But the most beautiful of all the Gothic towers is that of Nôtre Dame, at Antwerp, from whose summit can be counted over a hundred steeples, and in turn, from the sea, over a hundred miles out, can be traced this beautiful tracery in stone. And it is fitting that Rubens's masterpiece, "The Descent from the Cross," should have such a sanctuary.

Many of the civic buildings of Europe can boast of towers which are fine specimens of the Gothic, the most beautiful of which is that of the Town-hall of Brussells, some 200 feet high. This is of the florid Flemish Gothic. The fine tower of the Glasgow University Buildings, 200 feet high, by Gilbert Scott, is somewhat marred by the angle finialed turrets, making it top-heavy.

A species of tower that has a fine appearance are those that occupy the place of a dome and have a domical termination. The Town-hall of Bolton, in England, 270 feet high, is a fine example of this idea. That of the capitol at Albany, 250 feet high, is well-begun and carried up in fine proportion for three stories, but it should have a domical termination twice the height given it.

By far the finest tower-design in this country is that of the City-hall at Philadelphia. This tower is 537 feet high, being the tallest in the world, for the Washington Monument, which is thirteen feet higher, cannot be properly classed as a tower. The Philadelphia tower is not as well begun as either the Albany or the Bolton towers. It lacks the broad rustic base and the well-defined graduations from story to story that marks the offsets of the stories in both the Albany and Bolton towers. But it rises majestically, with well-sustained variety in its face. Were the tower attached to the new Odd Fellows Building in St. Louis, 236 feet high, more pronounced by a greater projection and more liberally treated in the last story, its architect could claim for it a place in the front rank of modern American towers.

The great beauty of towers, to my mind, is to see them start squarely from the ground, having the earth for a base. Nothing so offends my eye as a tower to first make its appearance astraddle of a roof.

For these reasons the campaniles command my admiration. They belong to the church and are always found standing guard over the venerable pile lying sheltered at their base. From their lofty lanterns the great bells call the faithful to prayer and remind man of his infancy, his manhood and his declining years as its warning peals ring out the "angelus" at sunrise, at meridian and at sunset. They are nearly all in the Romanesque, that of St. Mark's being a fine specimen of the Venetian Gothic. The loftiest is that of Cremona, Italy, being 395 feet high. Next comes one in Florence,

267 feet high. The best-known and the most remarkable is the leaning tower of Pisa, in which is hung a green bell, that never tolls but on the death of a criminal.

England can present one grand example in the clock-tower of the new Houses of Parliament, 350 feet high, by Barry. And Ireland another, the Albert Memorial Tower at Belfast, 100 feet high. Barry's is purely Perpendicular Gothic and very elaborate. The Belfast Tower has the lantern Gothic, with the shaft and clock panel Romanesque. The city of St. Louis has two good examples of the campanile, that of the Central —— Church, 135 feet high. In panelled shaft and open lantern it somewhat, at a distant view, resembles St. Mark's. The other example is the new water-tower, 200 feet high, which is very creditable to the designer.

Sir Christopher Wren, who was the first architect to Classicize the Gothic, has strewn London with beautiful towers and one beautiful dome. It is most incomprehensible that the architect who designed St. Paul's could be the same architect who designed the first dome submitted by him to the royal commission — a fine apple-shaped cupola, surmounted by a six-story pagoda. And yet the number and beauty of his towers is simply marvellous. He never attempted the Gothic, yet was he very successful in his addition of the twin towers to Westminster Abbey.

St. Clement's, Dane, St. Martin's, St. James's, Garlick Hill, St. Dunstan's in the East, St. Stephen's, Walbrook, and the three beautiful towers of St. Bride's, St. Magnus's and St. Mary-le-Bow — at least half a hundred towers, spires and cupolas rise before my vision as objects rise when you move from them, composing a beautiful architectural perspective, having for its "point of picture" the great St. Paul's.

Wren's towers are towers from the ground up, invariably square and plain, until the roof line is passed. And, although the upper stories are often repeated, yet the offsets are so artistically defined, by use of the cinerary urns, pyramidal vases and other ecclesiastical emblems, that the eye is satisfactorily led up to the distant vane.

Others of the English architects, such as Barry, Sir William Chambers, Smirke, Soane, Dance and Gibbs have supplied London with towers that are fit companions for Wren's. In the Classics, Mary-le-Bow, by Sir William Chambers; St. Leonard's, Shoreditch, by the elder Dance, and St. Martin's-in-the-Fields, by Gibbs. This latter is equal to the best of Wren's, but it has the great fault of rising behind a portico and astraddle of a roof.

Innumerable towers of great beauty, surmounted by spires, familiar to all architects, I have not mentioned because my intention was to treat of the tower proper, in opposition to the dome.

SOCIETIES

THE BOSTON ARCHITECTURAL CLUB.

THE annual reports, which were presented to the Club, November 4, contain many facts which will be of interest to the architectural and artistic public. The Club began its existence, August 17, 1888, since which time a constant interest has been manifested in every department, and the results accomplished have been most encouraging in every respect. It is not, strictly speaking, a professional club, since it comprises within its membership many who are engaged in the practice of the allied arts, sculptors, glass-workers, decorators and the like, though the proportion of non-professional members is restricted by the constitution to one-quarter of the entire number. Nor is it in any sense a sketch-club, sketching and drawing classes contributing to form only a portion of the year's work. Broadly stated, the club proposes to unite all who are truly interested in the profession and practice of architecture on the common ground of love for art and a mutual desire for self-help and advancement along all the lines which distinguish mere building from what is truly architecture. The membership at present includes many of the best architects in the city as well as a large proportion of the draughtsmen, so that without any thought of establishing an arbitrary standard of artistic merit as a requirement for admission, the club can be considered as fairly representing all sides of the profession.

There are at present about 170 members. The club-rooms are open all the time, and for a club of this size, are used very freely. Originally a single floor was leased, but the necessities of the classes and other features have so increased that at present, all of two and half of a third floor give none too much room. The monthly attendance from the beginning of this year has been as follows:

January	800	June	760
February	950	July	325
March	811	August	395
April	700	September	695
May	927	October	737

The largest attendance during any one day has been 126. The largest attendance at a lecture or conversazione has been 87. The total number of visits to the club-rooms by members and others during the past ten months has been 7100, or since the club was started, nearly 10,000.

Mere numbers, however, are not a very sure index of the work which has been done. Each of the Rotch Scholars, Mr. Newton and Mr. Josselyn, has been tendered a reception on his return to this city. Public exhibitions to which all are welcome without charge, have been held from month to month, including three exhibitions of the Rotch-Scholarship work, exhibitions of plans and studies for the new Public Library, stained-glass and tiles, water-colors, and drawings and sketches by Messrs. R. C. Sturgis, Dwight Blaney, Harry Fenn, Joseph Pennell, the *American Architect* Drawing-office, and others. Lectures have been delivered before the club on the Origin of Egyptian Architecture, by Mr. George Snell; on Italy, by Mr. C. Howard Walker; France, by Mr. R. D. Andrews; England, by Mr. R. S. Peabody; Spain, by Mr. G. F. Newton; and on the Relations between Architects and Clients, by Rev. E. E. Hale, DD.; while informal *conversazioni* have been held at which were discussed the topics of rendered drawings, methods of study, the planning of large buildings on the French system, water-colors, the designing of stained-glass and tile-work, and architectural travels in Europe. This comprises what might be termed the public work of the club. The classes have been limited only by the size of the rooms at their disposal. Mr. Ross Turner, in water-colors, Mr. D. A. Gregg, in pen-and-ink work, a sketch-class from the draped figure, a life-class from the nude, and monthly competitions in design have afforded ample opportunities for those who were disposed for such work. Enlarged quarters, recently acquired by the club, will enable it to add to these for this year a class in modelling, under Mr. Andrew Garbutt, and a class specially intended to prepare the aspirants for the Rotch Travelling-Scholarship directed by Mr. W. E. Chamberlin and Mr. G. F. Newton.

The club has purchased a large stereopticon and about 400 slides illustrative of the history of architecture, besides which, collections embracing nearly 2,000 slides have been placed at its disposal. These will be used by Mr. Walker in connection with illustrated lectures during the winter. All of the best artistic periodicals are kept on file at the rooms, and the nucleus of a library is forming.

During the year two excursions were made by the club, the first to the Chelsea Tile-Works, through the courtesy of Mr. J. G. Low, and the second to Newport, where the houses of Mr. Cornelius Vanderbilt, Mr. Van Allen and others were visited under the direction of Mr. Dudley Newton.

A club which has accomplished as much as this during its first year, with a total attendance of nearly ten thousand drawn chiefly from the ranks of the busiest of professions, has certainly demonstrated its reason for being, and can fairly hope for still larger and better results during the coming year.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

STRAW-BOARD.

SARATOGA SPRINGS, N. Y., November 19, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Can you inform me in the columns of *The American Architect*, where I shall get heavy, say ¼″ thick, straw-board, rolled hard and smooth, 3′ 8″ wide. Perhaps it can be secured of papier-maché and if so, would be preferable to the straw-board.

Yours very respectfully, R. NEWTON BREZEE.

[WE have obtained excellent material of this nature from Charles T. Wheelock, 64 High Street, Boston. — EDS. AMERICAN ARCHITECT.]

BOOKS.

LOUISVILLE, KY., November 21, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Having been several years in an architect's office in this city, and finding I am more capable of attending to "outside work" than "office work," and having decided to make a study of outside work, supervising, etc., I write you for information as to the best books on this subject. Hoping you will favor me by letter and oblige. Respectfully yours, JOHN H. THOMAS.

[CLARK'S "*Building Superintendence*"; Kidder's "*Architect's and Builder's Pocket-book*"; "*Notes on Building Construction*" published by Rivington, London, will be found of as much service as any English books. — EDS. AMERICAN ARCHITECT.]

"*SAFE BUILDING.*"

DUBUQUE, IOWA, November 26, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I have a book by the name of "*Safe Building*," and I believe at the time I ordered it, I was told that it was the first of a

series. Can you tell me if part second will be published in book-form this winter. Yours, G. F. Guilbert.

[The second volume of "*Safe Building*" cannot be published until after these papers have been completed in this journal and it is not now possible to state when this will be. — Eds. American Architect.]

REPORTERS' "FIREPROOF BUILDINGS."

Buffalo, N. Y., November 29, 1889.

To the Editors of the American Architect :

Dear Sirs, — I hope that you will make some editorial comment on the construction of the principal buildings destroyed in yesterday's fire in Boston, and their action during the fire. A great deal of damage is done to the cause of good building in this city, and, I presume, elsewhere, by accounts of such fires as this under newspaper-headings such as these, which appeared in this morning's papers: "Fireproof Buildings Melt like Wax in the Flames"; "Like Tinder"; "Splendid Fireproof Granite Structures Swept Away with Neatness and Despatch"; "Buildings apparently Fireproof as the Alps Completely Gutted"; "Modern 'fireproof' buildings, like the Ames Building at Bedford and Kingston Streets, built after the most approved fire-resisting plans, were licked up with a rush and a roar at the same appalling speed as the wooden shoe-factories at Lynn," etc.

Now, my recollection of the buildings burned is that no one of them ever pretended to be fireproof; that the best of them only had the so-called slow-burning construction. But business men will quote to-day's newspaper accounts to prove the futility of erecting fireproof structures, since they will burn as quickly as wooden buildings, and will say that it is impossible to build a really fireproof building.

I would like very much to see some account of the action of the "slow-burning" buildings under the fire; what effect they may have had in checking its spread, and whether there were any really fireproof buildings in the way of the fire which helped to stop it.

I regret exceedingly to hear of the destruction of the magnificent Ames Building, which was one of Mr. Richardson's most beautiful works, and only hope that it may be restored.

Yours truly, H. C. Burdett.

[As will be seen in our editorial columns, there were no fireproof buildings within the burnt territory, but it is true that "slow-burning" construction, in the Ames Building, failed to do all that was expected of it. However, it must be remembered that the timbers and planks in the Ames Building, although thick, were, in great part, oiled or varnished, that it opened by very large, unprotected windows on two narrow streets, and that the neighboring Brown-Durrell building, in which the fire started, was filled not only with goods, but light board partitions, which helped to produce a combustion like that of a blast-furnace, which nothing but iron and clay could resist. — Eds. American Architect.]

NOTES AND CLIPPINGS

Why Wires are Deadly. — The following letter shows the results of recent experiments made by the Board of Health in regard to the safety of electric wires :

Health Department of the City of New York, October 15, 1889.

To the Sanitary Superintendent :

We visited the plant of the Manhattan Electric Light Company, at Eightieth Street and Avenue B on the 14th inst., and inspected the dynamos in operation thereat, testing the leakage of electric current from each. This station has but recently been completed, and we are informed that most of its wire is new. The following is the detailed result of our investigation :

No. of test.	Character of Dynamos.	Volts — leakage.	
		1st side.	2d side.
1	Continuous Current, Jenney	900	1,650
2	Continuous Current, Jenney (not running)	None.	None.
3	Continuous Current, Jenney	None.	1,020
4	Continuous Current, Brush	None.	None.
5	Thomson-Houston, No. 1	300	150
6	Thomson-Houston, No. 2	None.	60
7	Thomson-Houston, No. 3	None.	30
8	Alternating Current, No. 1	450	600
9	Alternating Current, No. 2 (not running)		
10	Alternating Current, No. 3	150	150
11	Alternating Current, No. 4	450	450
12	Alternating Current, No. 5	600	450
13	Alternating Current, No. 6	600	600
14	Alternating Current, No. 7	450	450
15	Alternating Current, No. 8	450	300
16	Alternating Current, No. 9	600	600
17	Alternating Current, No. 10	300	450

The Cardew patent voltmeter was used for this purpose, one terminal being grounded. The instrument contained three resistance coils in series with it, so that the voltage could be read from 30 to 3,600 volts. The coils were wound so as to cancel the effect of self-induction, and the apparatus has recently been tested by two authorities and found correct within one volt. A third calibration test is now being made.

This leakage indicates imperfect insulation. A person touching a wire leaking at a defective point would, if a ground connection were made at the same time, receive the amount of leakage indicated in our table. It is our opinion, based upon our own experiments, and authentic records of the experiments of others, that an alternating current of 250 volts is dangerous to the life of any person through whose body such current might pass; also that a continuous current of 700 volts is, in a like manner, an unsafe amount of electrical force to be permitted to be used upon an imperfectly insulated wire.

We therefore respectfully recommend that proper measures be taken to reduce the electrical pressure upon wires used in the city of New York to less than what we have indicated as unsafe.

(Signed) Cyrus Edson, M.D,
Chief Inspector.
Edward W. Martin.,
Chemist.

It is understood that the amount of electricity on the wires at the time of the experiment was 2,500 volts. — *N. Y. Evening Post.*

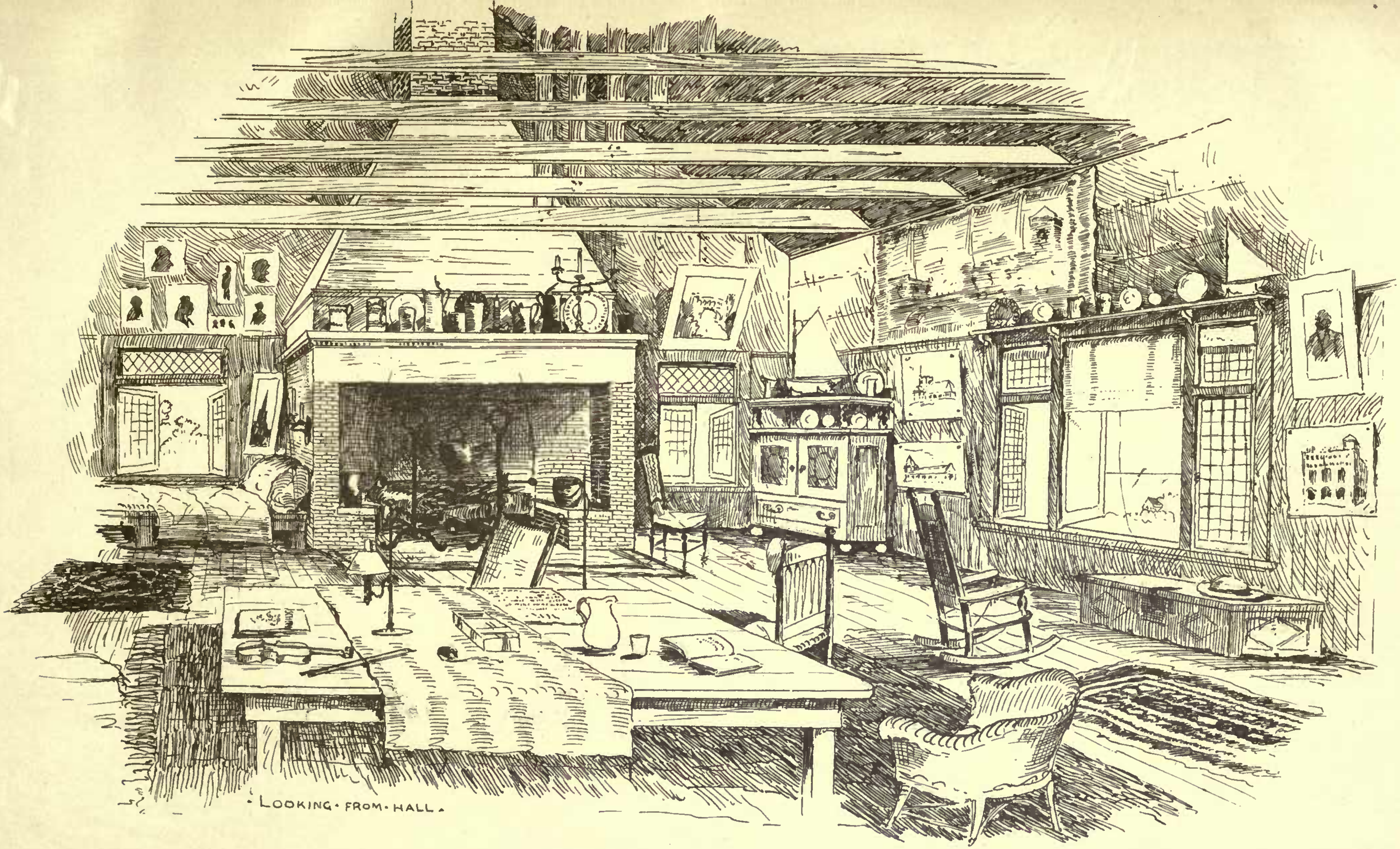
The Earliest Electric Lamp. — The first electric light in a dwelling-house in the world is said to have been used in Salem, Mass., in a parlor which was lighted every evening during the month of July, 1859, by the electric light, and it was subdivided, two lamps being used, either of which could be lighted by turning a little button to the right. The current, says *Light and Heat*, was taken from a galvanic battery of about three dozen six-gallon jars. The electrical genius who thus accomplished so much was Mr. Moses G. Farmer, an eminent electrician, who is still alive, though in feeble health, at Elliot, Me.

TRADE SURVEYS

As a favorable trade indication, reference may be made just at present to the reports from a number of builders in the larger cities of the country. In nearly all of them preparations are being made for a large amount of building next year, consisting of dwellings, shops, manufacturing establishments and general construction work. The reports of this year's operations, so far as received, show that the year has been better than last year, and that builders have not over-reached themselves. A good many doubts have been expressed in building circles relative to house-construction, and the opinion has been entertained in many quarters that it has been overdone. But the reports show that this opinion is an erroneous one, and that there are more buyers and renters of houses awaiting homes than ever before. This is particularly true in New York, Philadelphia, Chicago and St. Louis, but also applies to dozens of smaller cities throughout the country. In New York, a large amount of house-building is projected for next year on Long Island and at many points within easy reach of transit facilities. In Philadelphia, preparations have already been made for building two thousand houses next year. In Pittsburgh, building will be actively prosecuted, and in several smaller towns and cities in that locality a great deal of work is projected. Chicago and St. Louis builders have been greatly encouraged ; all the properties erected have either been rented or sold already, or are now in process of passing out of first hands. The wage-workers in all sections of the country are better employed and better paid than ever before, and it is probable that the demand for labor will be greater in 1890 than it has been this year. The better conditions abroad will probably restrict emigration, and the urgent demand for machinery, equipments and supplies of all kinds will call for all the skilled labor available. Latest advices concerning the intentions of the labor leaders show that the Federation of Labor will probably make a more or less vigorous effort to inaugurate a strike "all along the line," as one of the leaders terms it, but there are no strong probabilities of such a strike being successful. The vast majority of American workingmen prefer to abide by the law of competition to fix wages and hours of labor. There is a decided growth of conservative feeling among the rank and file. Another very favorable indication is the projection of new manufacturing schemes, which are not confined to any one section of the country. The extraordinary activity in the South causes Northern capitalists and investors to take more interest than ever in Southern enterprises. The success of the iron-makers of the South, especially, has induced many others to follow in their footsteps. Several new steel works have been projected within two months.

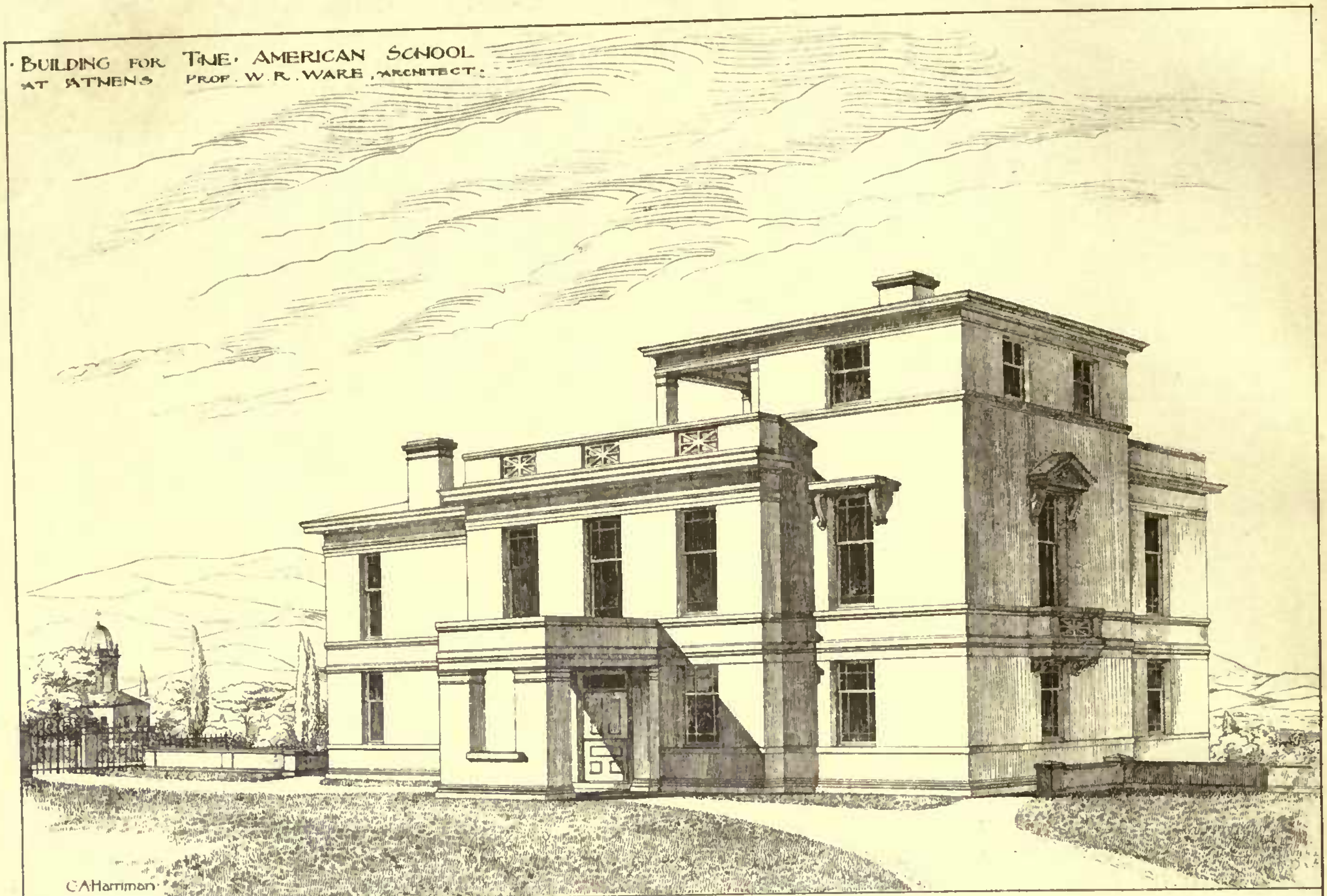
Northern lumber manufacturers are interesting themselves largely in the development of new timber territory ; one authority states that within ninety days 200 saw-mills have been projected. Another authority has undertaken to give an estimate of the foundries projected, only to find the number to far exceed any reasonable probability. There is urgent need of more foundries, saw-mills and small shops in the Southern States ; the same is true, in a great degree, of the States west of the Mississippi ; but bad crops for several seasons have somewhat retarded industrial development in that region. Another favorable indication of recent origin, is the projection of a great deal of railroad-building in short lines, in both the South and West. Stock-brokers are endeavoring to create doubt as to the permanency of present commercial conditions ; but a careful review of the whole situation will not substantiate their opinions. The country — financially and commercially — was never on a more solid basis. The reports of the commercial agencies show a slight increase in the number of failures ; but these failures simply mean the clearing away of stumbling blocks. New York and Boston bankers know and say that the solvency of the business interests was never more perfect. While the supply of money is not what it ought to be, or could be, under a more enlightened financial policy, there are no grounds whatever for the insinuations and assertions that the business interests are threatened with serious evils, either from within or without. Business men can safely venture upon new enterprises ; manufacturers can safely push forward extensions and increase facilities with the firm assurance that their full product will be called for by the opening of the coming season. Small shopmen in the New England and Middle States have been doing remarkably well. The lumber interests of the Northwest are endeavoring to accumulate large stocks for the assured heavy demand next year. Hardware manufacturers and dealers have not been as busy for several years. It would be difficult to pick out a single industry wherein there is any well-defined weakness. The extension of capacity will probably be continued until the danger line is reached. A comparison of the prices now ruling, with those ruling twelve months ago, shows, after all, that no very great advance has been made ; this is an encouraging and important fact. Speculative tendencies are threatened in many directions, but the inherent forces at work in the industries will protect consumers against any dangerous advance. It is this point which the pioneers in new work are watching most carefully. A large amount of railroad and general construction work will be projected and arranged for during this month ; so far nothing has transpired to check the inauguration of new enterprises, at least, so far as cost of material or labor is concerned. Should there be any decided advance in either, it is safe to say that manufacturers, large and small, will book three to four months' business for winter and spring execution within the coming four to six weeks.

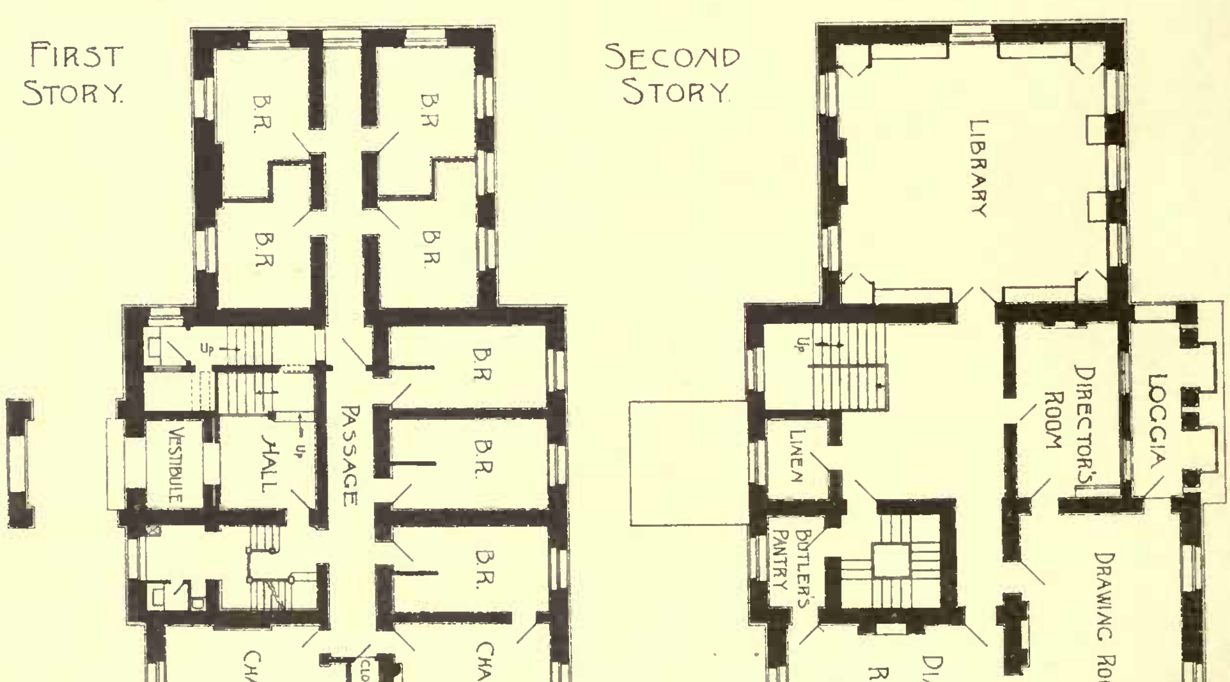
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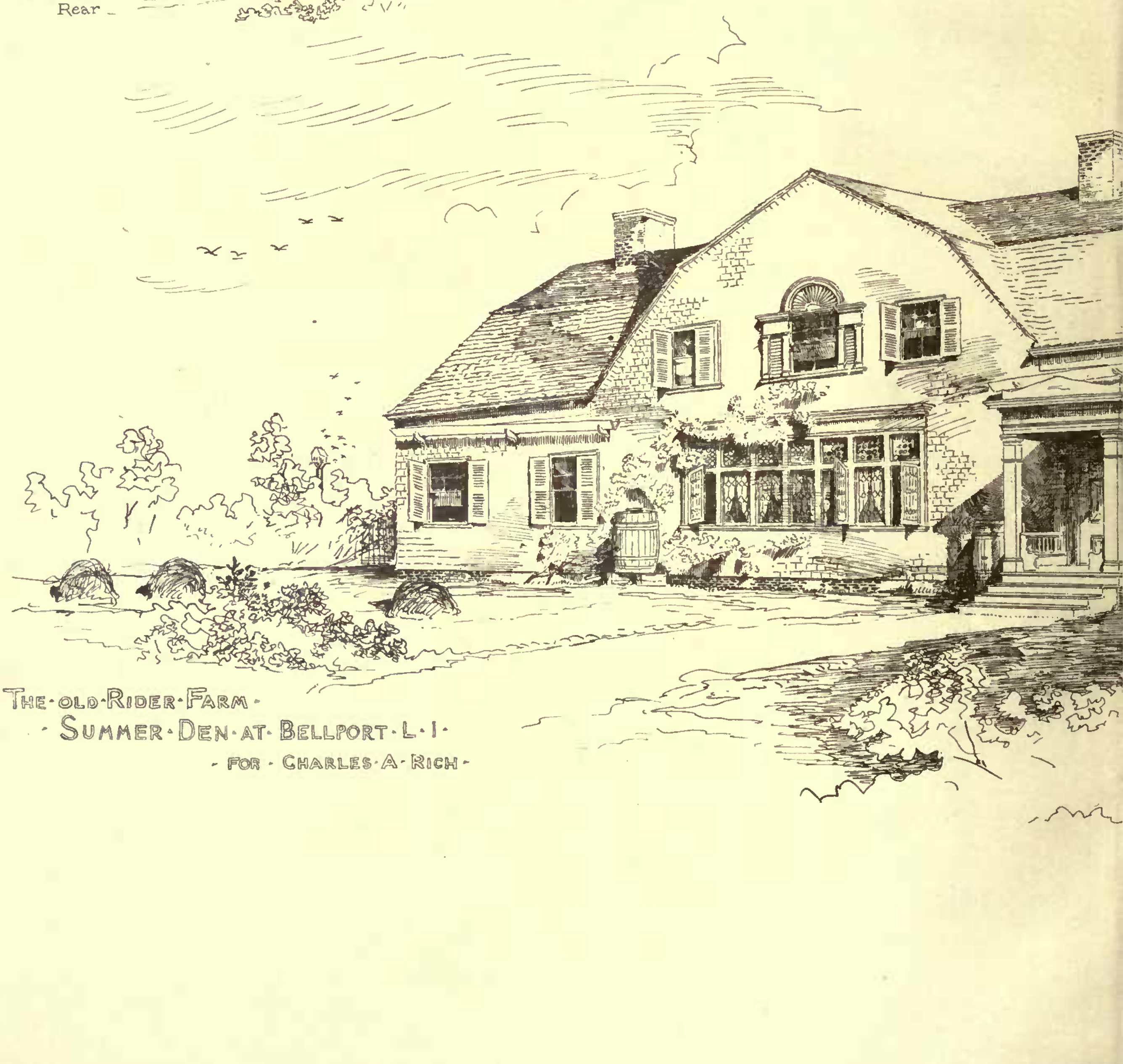

Building for the American School at Athens
Prof. W. R. Ware, Architect.
C A Harriman


First Story
B.R.
B.R.
B.R.
B.R.
Up
Vestibule
Hall
Up
Passage
B.R.
B.R.
B.R.
Chamber
Closet
Chamber
Second Story
Library
Up
Linen
Director's Room
Loggia
Butler's Pantry
Dining Room
Drawing Room

AMERICAN ARCHITECT AND

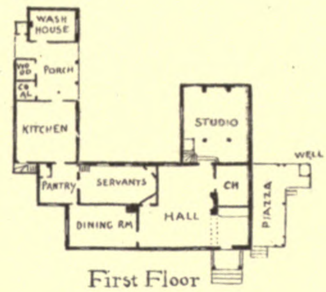


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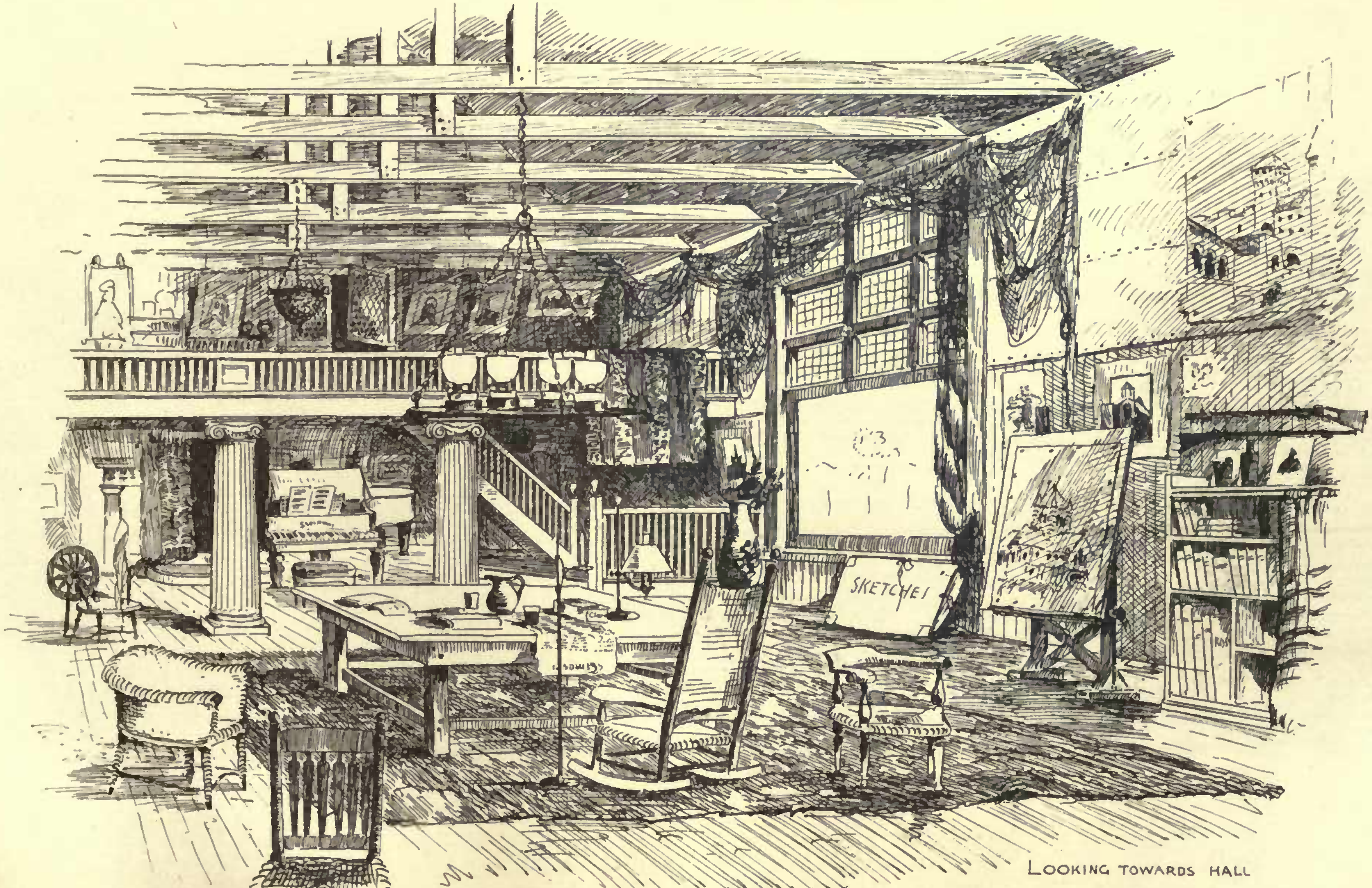
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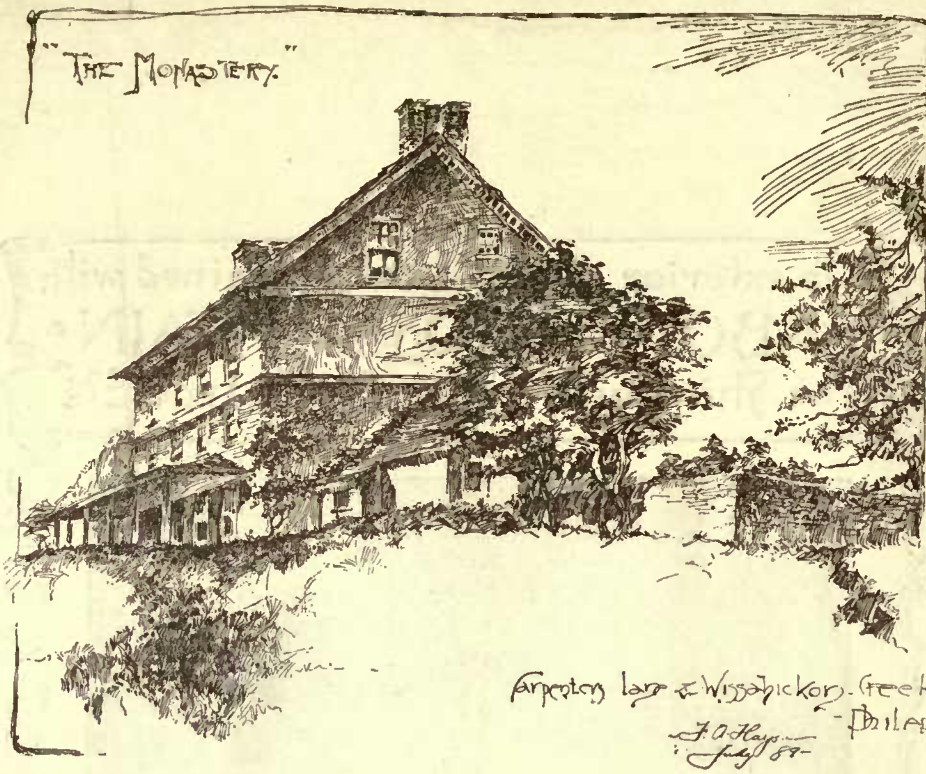
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WE hope that the new Institute will not forget that it is now in a condition to do what the Royal Institute of British Architects has been doing for the past two or three years, to the great advantage of the profession in England, that is, to begin a process of selection among the young aspirants for admission into the profession, by requiring them, after a certain date, to pass an examination. At present, no person, not an established architect of good reputation, is received into the Royal Institute of British Architects, except from the ranks of the Probationers, who are young men, who have voluntarily submitted to examination by the Institute examiners, and have passed the examination satisfactorily. On passing the examination, a certificate is given to the successful candidate, who is thenceforth eligible to the Institute, and, if he conducts himself properly, is elected to it in due time. This regulation was adopted by the Institute only after great opposition, and with the prediction that no one would apply for the examination, and that the Institute itself would go to rapid decay. Instead of this, the successful passing of the examination has already become the ambition of every student of architecture in England worthy of the name; the Architectural Association maintains regular classes, taught with zeal and skill, for preparing its members for it, and the Institute itself, so far from losing in credit among the young men, has become, as the dispenser of certificates, more important and honored than ever before, while, instead of losing in membership, the number of those who wish to get into the Institute increases every year, one hundred and seven candidates having already presented themselves for examination this year. More than this, as is well pointed out by the editor of the *British Architect*, the effect of the new regulation is to accomplish in the quietest and best way what many architects wish to see done by Act of Parliament, in a manner offensive to most of the profession, that is, the elimination from the profession of the ignorant bunglers who now encumber and disgrace it. Both the public and the profession agree that these people ought to be shut out, but they also agree that there are almost insuperable difficulties in the way of immediately selecting and expelling them. By the new system they will be, during the next generation, insensibly separated and rendered harmless, without violence or injustice to any one; because the men who have been examined and certificated will associate themselves together, just as the "architectes diplomés" have already done in France; and as it will be perfectly easy, and very advantageous, for any competent person to obtain the certificate, the public will soon learn to demand the visible sign of skill from those to whom important building affairs are to be entrusted.

ANOTHER contractor has been spending a good deal of money and time in learning a piece of law which he might have got just as well by reading any one of several numbers of this journal. In the Court of Common Pleas in Philadelphia, a few days ago, the American Artificial Stone Company brought suit against one of the city officials, for nineteen thousand dollars damages, for failing to award to the Company the contract for lining the East Park Reservoir. It seems that the official in question, Director Wagner, advertised for bids for doing the work, and the Artificial Stone Company was the lowest bidder. Mr. Wagner considered the proposals, but, instead of awarding the work to any of the bidders, advertised for new proposals, in accordance with modified specifications. The Artificial Stone Company did not submit a second bid, but contented itself with bringing a suit against Mr. Wagner personally for not accepting its first one.

IT is hardly necessary to say that the suit was thrown out, for two reasons, either of which would have been sufficient to defeat the stone company without the other. In regard to the first point, the judge said that the claim appeared to be "based upon the theory that a bidder who is the lowest in the amount of his bid, and against whom the city or its proper officer makes no specific objection as to his responsibility, is legally entitled to have given to him a contract for which he has bid." This theory, which, we are sure, is a very familiar one to our readers, "cannot," the judge said, "be maintained." We have often described similar cases, and have read accounts of many more, and, as the opinion of the judges has always been to the same effect, it is surprising to us that the stone company should have been able to find a lawyer who would encourage it to bring such a claim into court. In spite of the odiousness of comparisons, we cannot help wondering what lawyers would have to say about an architect who advised or encouraged a client to adopt a method of construction which was theoretically opposed to the principles of statics, as taught by his technical books, and which, moreover, had been tried a score of times before, and had invariably failed. As to the propriety of suing Mr. Wagner personally for acts done in his official capacity, the court said that it was "altogether clear" that, in the absence of evidence showing malice or bad faith, no personal liability would arise on the part of an officer exercising duties of a judicial or discretionary character for acts done in the line of his duty, notwithstanding they might have been "erroneous in fact and injurious in consequences."

FIRE AND WATER gives an account of the recent conflagration in Boston, which may be taken as coming from an expert, and mentions a few interesting points. It is curious that the first alarm was given from the same box from which was sent out the alarm for the great fire in 1872, which also began in Kingston Street, then occupied by small dwelling-houses. In just one minute from the striking of the alarm an engine was on the spot, but the flames had burst from every window in the building, the Brown-Durrell store, before a line of hose could be laid. In a few moments fourteen more engines had arrived, but the heat of the fire was so intense that the solid streams of water from the hose turned into steam before they entered the windows, and the engines might just as well have blown air at the flames. In twenty minutes the walls fell, and the fire crossed the two adjacent streets. All the engines in the city, thirty-three in number, were hurried to the spot, and help was summoned by telegraph from all the neighboring towns, and even from Springfield, a hundred miles away, and, notwithstanding the heavy rain which prevailed during most of the time, nearly seventy engines were assembled, and pouring rivers of water on the fire, before it was subdued.

THE German Krieger-Verein, or Grand Army Association, proposes to erect a monument to the late Emperor William on the Kyffhauser Mountain, a spot connected by very ancient traditions with the nationality of the Germans, many of whom believe to this day that their great Emperor Frederick Barbarossa lives still in the subterranean chambers of the castle on the mountain, where he sits, leaning his head on his hand, beside a stone table, through which his beard has grown in the seven centuries that he has been waiting for the summons which is to call him from his concealment to lead for the third time a vic-

torious army against the enemies of Christ. Whether the modern German soldiers chose the place with the idea that their good and brave old Emperor inherited and carried out the work of Barbarossa we cannot say, but the legend ought to furnish some inspiration for the monument. The design is to be selected in competition, and all subjects of the German Empire, whether residing in Germany or not, are invited to take part in the competition. Whether the design shall be partly architectural, or consist purely of sculpture, is left to the judgment of the designer, but a figure of the late emperor must be introduced, in military costume, at double life-size. Designs must be delivered in Berlin before June 1 next, and must consist wholly or partly of models at one-tenth the full size, and each competitor must agree, if required, to devote himself on the spot to the execution of the work until its completion. The cost is limited to four hundred thousand marks, or about one hundred thousand dollars. The jury of award consists of noted architects, sculptors and painters, and prizes of six thousand, four thousand and three thousand marks will be given for the three best designs. No promise is made to employ the author of the design placed first to carry out his design, but, if he should be so employed, his prize will merge in his commission. Further particulars may be obtained from Dr. A. Westphal, Blucherstrasse, 23, Berlin, S. W.

A CHURCH is being erected, under some difficulties, in the Falkland Islands, near Cape Horn. There is an English settlement there, called Stanley, of which probably few of our readers ever heard. However, Englishmen away from home are not long contented without a church to say their prayers in, and the people of Stanley have made up their minds to have not a church merely, but a cathedral, with a bishop and chapter, and have raised fifteen thousand dollars toward paying for it. Sir Arthur Blomfield, who is, if we are not mistaken, the son of a Bishop of London, has made the designs, and the materials are on their way from England. As there is no building material of any sort on the islands, it has been necessary to transport bricks, lime, cement, timber for the rafters, iron for roofing, and ready-made pews, half-way around the world, accompanied by two expert bricklayers and a clerk-of-works. As the brick, which cost ten dollars a thousand in England, paid twenty-two dollars a thousand for transportation, and other materials in proportion, the cathedral will be a tolerably expensive affair by the time it is done.

THE French have a theory about the payment of architects which is not without its charm, and which we find described in a particularly clear manner in a recent number of *La Construction Moderne*. Every architect knows that contractors in France have a peculiar method of bidding, consisting in an offer to do the work on which they bid for a certain discount from the official *série de prix*, or price-list, a document drawn up with great care, and revised from time to time, by a commission of architects and contractors. This official price-list give the rates to be charged for all conceivable kinds of building work, including a reasonable profit to the contractor, and is usually made the basis of payment for small jobs, such as are done among us by the day. In larger undertakings, however, the competition between contractors is sharp enough to induce them to forego a part of the profit which the price-list would give them, for the sake of securing the remainder, and so many considerations enter into the estimates that it is not unusual to have bidders offer to take a contract at twenty-five per cent, or even a greater discount, from the *série de prix*. Under our system, by which the architect's commission is based on the actual cost of the building which he designs the keener the competition among the contractors, the less is his pay. The French practice, however, for all Government and other important work, is to pay the architect his five per cent commission on the cost as it would be by the full official price-list, ignoring the actual cost, which is usually one-fifth to one-fourth less. In private work the law is not quite settled, although most of the decisions sustain the architect in claiming his fees on the full *série* prices in this case, following the rule established by a special decree for Government work, on the ground, as M. Ravon explains, that the architect's time and trouble are, by well-established custom, worth a certain percentage on the cost of the building which he designs, as it would be if paid for at fair rates, with a reasonable profit to the contractors concerned; and that, this being so, the fact that a contractor is willing to do his part for a small profit, or no profit at all, instead of diminishing the architect's care and trouble, increases it, as he has then reason to expect that the low-priced contractor will try to squeeze out an illegitimate profit from his cheap job by all sorts of tricks and frauds, and feels himself obliged to redouble his watchfulness to prevent these tricks from being successful. It is a question, M. Ravon thinks, whether the architect should not be paid more when the contract is made with the builder at less than the regular rates, and, at least, the builder's discount should not lessen the architect's pay. That this is an important matter for French architects, particularly those in the country districts near Paris, where the Parisian *série* is used, although the cost of materials and labor is less than in the capital, may be judged from the letter to which M. Ravon's article is a reply. The letter is from an architect, who was engaged to make an addition to an old building. He estimated the cost at thirty-six hundred dollars. The contractors agreed to large discounts from the official prices, and when the bills were all in, they amounted to seventy-six hundred dollars. The architect disallowed some of the claims, and fixed the value of the work done, according to the price-list, at sixty-nine hundred dollars. Applying the agreed discounts to this sum brought the net amount due down to forty-five hundred dollars, and the contractors took this, and were satisfied. The architect sent a bill, according to custom, for five per cent on sixty-nine hundred dollars, while his client offered only the same percentage on forty-five hundred, and the question was referred to M. Ravon's skill.

M. CHENEVIER, who has given much attention to the subject, presents, in *La Semaine des Constructeurs*, his idea of a safe theatre, which contains some novel points. M. Chenevier begins by saying that he does not agree with the modern theory, that the auditorium of a theatre should be provided with as many exits as possible. In his opinion, the stage is the only source of danger, and must be first made secure; and, if this is secure, there will be no risk of fire in the auditorium, and, therefore, no need of providing numerous exits from it. He acknowledges that this is just now an unpopular doctrine, and says that in his plan he has provided more staircases than he thinks necessary, partly in deference to the common prejudice, and partly for the sake of reassuring the minds of an audience, which needs protection from imaginary as well as real dangers. For the protection of the stage, he proposes to use the familiar appliances of iron curtains, standpipes, hydrants, signals and so on, and he would have the drop-scene painted on wire-gauze. The auditorium is without the usual ventilator over the chandelier, and is provided with a large number of exits, closed with light iron doors. The corridors are separated from the rest of the building by brick walls, and the staircases lead separately to the street. All the lighting is done by incandescent electric lamps fed by storage batteries. All the exits are to be constantly left open, and, as he says, there are to be no iron ladder fire-escapes, no doors that no one can unlock, no keys hung up behind panes of glass, or other terrifying and confusing appliances which people flying for their lives cannot understand or use.

ANOTHER competition is announced for a building at Lausanne, to be used to contain the scientific and artistic collections belonging to the city, as well as to accommodate certain departments of the University. This competition is open to architects of all nations, and five thousand dollars will be distributed in prizes. Particulars can be obtained by addressing M. S. Cuenoud, President of the Council of the city of Lausanne, Switzerland. The competition closes April 30, 1890.

FOR the sake of the many subscribers who receive their journal through the News Companies and other trade channels — whom we have made no endeavor to reach by circular — we will again draw attention to the fact that during the next year will be published an "International Edition" of this journal, the particular characteristics of which will be found explained on page xix. Any such subscribers who may wish to receive this larger and better edition, we ask to send on their subscriptions at once. We have already cabled an increase of our first orders, and there is yet time to procure an additional supply, provided those who have been in ignorance of the movement, or who have overlooked it, or who have hesitated how to act, will send in their subscriptions at once. We repeat this notification in the interest of all such readers.

MILLS AND MILL ENGINEERING.[1]



Doorway at Dantzic. From *Architektonische Rundschau.*

IT is obvious that many parts of the work of planning and building mills are substantially similar to operations in other branches of engineering. Our subject limits us mainly to points which are peculiar to or specially prominent in mill engineering. It cuts us off from the discussion of many matters of the first importance with which all engineers are acquainted, but leaves us a multitude of secondary or minor points which may have some novelty and interest for workers in other branches of the profession.

One advantage which the mill engineer has, preëminently, is that he has numerous opportunities to observe the results of many risky experiments tried by men whose knowledge, prudence and judgment vary greatly. Much can be learned from such observations, but it is not wise to generalize very dogmatically from a single failure — much less from a single escape from failure.

To begin at the bottom — it often becomes necessary to build high mills and heavy storehouses over arched water-ways much larger than ordinary conduits or sewers. Many of these water-ways, ten to sixteen feet wide, are built with wooden floors, sometimes sub-filled with concrete, brick side walls sixteen to twenty-four inches thick and four to six feet high, and brick arches rising one-fifth to one-half the span, twelve or sixteen inches thick. It is obvious that the thrust of these arches must be resisted mainly by the earth back of the walls (which is filled-in, of course, before the centres are struck). This seems rather risky, but I do not remember any instance of failure or serious crippling in such a case. These arches are usually loaded with five to twenty feet of earth, and sometimes piers to carry twenty tons each are built upon them, wherever they chance to come. In good practice the arches are thickened at such places.

Single race-ways often take the water from two or three turbines, say 250 to 400 c. f s.; in which cases they are likely to be from twenty to twenty-five feet wide and five to eight feet deep, with side walls of rubble-stone laid in cement mortar and brick arches of about one-fifth rise and sixteen inches thick. Where mill columns come over such arches, it seems to me best to support them by trusses, independently of the arches.

Many mills are built on the banks of rivers, from which it follows, not infrequently, that one wall stands on good hard bottom and the opposite one on piles. At the points of change we are likely to have a deep foundation-wall on earth bottom, adjoining very short piles in soft material, and to feel some anxiety as to unequal settlement and possible cracking of the superstructure. But in the few cases which have come under my own notice I have not observed any such results.

In many cases the bottom on the river side is softer than on the other side. It may not need piles, but only a wider earth base in the foundation-walls. I have seen a few very old mills which were still settling and cracking from insufficient earth base on the softer parts of the sites; but I think these cases of long-continued settlement are rare.

In the very common case of the up-hill side of a mill standing on a bank wall with a surcharge of five to twenty feet of earth on the outside, these walls often yield slowly to the relentless pressure. For several months in every year a thick stratum of earth is powerfully expanded against them by freezing. When the earth thaws, it follows up any yielding which has occurred, and the process is repeated in every succeeding winter and summer.

An accumulation of a few inches of such movements in twenty to fifty years, which might not be specially noticeable or objectionable in a mere retaining wall, will seriously distort a mill — especially an old-fashioned, narrow and high one — throwing some of the walls out of plumb and straining their connection with the others; also throwing columns out and bringing the weights on to them diagonally instead of axially, and endangering the stability of small pintles at the floor beams, if such are used. Many and probably most old mills with unbalanced earth-pressure on one side have been considerably distorted in this way. The modern practice of building such bank walls with cement-mortar and draining the earth behind them will doubtless contribute materially to their stability.

The large dimensions of modern mills raise into importance certain considerations, which are often ignored with impunity in the case of buildings cut up into rooms of smaller sizes.

One of these is that an unbroken floor of three-inch plank, four or five hundred feet long, will change its length as well as its width, with changes in the amount of moisture which it contains. I have known a tightly-fitted lower floor of well-dried plank to expand lengthwise enough to push the end wall of a mill out and crack the side wall at the first window from the corner, with no settling, or any change except mere horizontal separation. The end wall was well fastened to the floors above, and as these did not gain moisture there was no crack anywhere above the first-story window.

On the other hand, I recently examined a mill nearly 500 feet long, which was floored throughout with planks just from the log. In drying, all the floors above the first-story shrunk from four to six inches in the whole length, and as they were not well fastened to the end walls, after bending these walls in an inch or two, they pulled away from them, leaving a gap of an inch or more at each end. Of course, the floor-beams were also moved toward the middle of the length of the mill and carried the columns along with them. Probably the ground-floor shrunk but little, leaving the bottoms of the first-story columns about in place, so that they were *canted* out of vertical perhaps two inches at the ends of the mill, and diminishing from that to nothing at the middle. They were about sixteen diameters long, so that an inclination of two inches would throw their end planes one-eighth inch out of level, leaving only small areas in bearing, with crushing pressures at the salient edges, and bending the axes of the columns into reversed curves.

If the columns had been made of cast-iron instead of wood, the diminution of end surface in bearing and the resulting concentration of pressure would have been vastly greater, owing to the rigidity of the material.

If the ends of a column are not plane and square with the axis, or if the surfaces against which they bear are not plane and level, the same mislocations of the pressures occur, and the column suffers still more by being bent wholly to one side instead of into reversed curves on opposite sides of the line of pressure.

It is evident that the consequences are the same when such mislocations of pressure are caused by poor work in the original construction, as well as by any subsequent movement. Probably there are many cases where bearing-surfaces, say nine inches in diameter, are open $\frac{1}{32}$ inch at one edge, which may be caused by setting a post one-half inch out of plumb, or by other poor work. This is too much for wooden columns, far too much for iron ones.

It seems rather probable that these poor fits materially lessen the resistance to horizontal vibrations of floors, which is often troublesome in mills where looms are beating.

It is common to cast the bearing plates with rims around them, forming sockets to receive the ends of the columns. These sockets effectually conceal the worst possible fits between column and plate, as made by the most careless builders, and also prevent the most careful ones from seeing whether the fits are good at first and whether they remain so. Such sockets at the lower ends of columns hold all the water that happens to reach them, and are thus very efficient in rotting the wood. I have traced rotten cavities made in this way several inches up from the base.

The ostensible reason for making these sockets is to hold the columns in place. But, ordinarily, a central projection, cast on the plate, say one and one-half to two inches in diameter and one inch long, fitting into an axial hole at the end of the column, gives security enough. If the column is bored for ventilation the hole is already there.

One of the worst *fumbles* ever made in mill-construction is in the matter of pintles for carrying the weight from a column down through floor beams to the column below, or between loose plates at the ends of such columns. These have often been made of iron cylinders about four inches in diameter and with rough ends. The ill-fated Pemberton mill *teetered* out its brief life on props of this kind.

A large building was recently erected near here with oak blocks five inches square, trying to act as pintles on cast-iron columns nine inches in diameter and one and five-eighths inches thick.

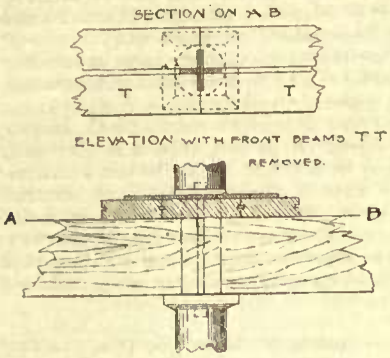
A high and very heavily loaded building stood for several years, near here, with T-shaped pintles having stems $2\frac{1}{4}$ x 4 inches butting together in mortises through the floor beams, and each carrying loads from 200,000 to 300,000 pounds. As it is practically certain that in many cases the ends offset, more or less, at the place of meeting, and that many of them were *canted* so that their end planes were not in the same plane, the wonder is that very few of them failed, and the building continued to stand till it was re-enforced.



The method of cutting the beams short, and carrying the column down to a plate resting on the column below, which is long and strong enough to carry the beam ends also, is much safer when properly arranged, and answers well for storehouses.

[1] Extracts from a paper read by Mr. Edward Sawyer, member of the Boston Society of Civil Engineers and discussed at the meeting of the Association of Engineering Societies, and published in the *Journal of the Association of Engineering Societies.*

But for a good class of mill-work suitable pintles are much better. A very little consideration will show that the end plates and the connecting part between them ought to be cast in one piece. The connecting part, or stem, is best made of cruciform cross-section;[1] and it should extend up to the top of the floor, carrying its top plate just above this level; so that the column above is favored as to dry-rot, and is above water when the floor is washed, and it also has the advantage of leaving the joint in sight. This requires a central boss on top for holding the upper column in place, as well as one below for the lower column. In extra wet places, like dye-houses, it is a good plan to carry the top several inches above the floor.



Finally, the castings should be centred on the ends of these bosses, put into a lathe and the bearing-ends turned off square with the axis.

I began to use pintles of this kind nearly twenty years ago, and have used thousands of them with entire satisfaction. They fulfil all the requirements perfectly, and there is no good excuse for not using pintles of this general type in all ordinary cases, or for using small prisms separate from the end plates in any case.

Many carpenters like to fit floors in very closely, especially top-flooring boards. Sometimes these are cut long and sprung in with the well-known action like that of a toggle-joint, so tightly that the ends of the boards are very noticeably *upset* against the irregularities of brickwork. This, of course, means a pressure of several tons per board. By accumulating pressure from several boards in this way, it is easy to bulge out a wall or to pull it apart longitudinally, making a crack from a window above to one below the floor which exerts the pressure, especially in the upper stories, where the walls are thinner and weaker than nearer the ground.

The non-expert public usually charges such cracks, as well as most others, to defective foundations, even when they appear far above the ground, and with no other rupture above or below them; in which case a very little reflection ought to show the absurdity of this notion.

This results largely from the intuitive feeling which most people seem to have that brick or stone walls will stand almost any amount of pressure, either compressive, tensile, bending or detrusive; partly also from the difficulty of realizing the meaning of words or figures representing very large forces. When represented by the gravitation of visible masses of matter like stone or iron, they affect the mind for something nearer their real value. People who are accustomed to move such masses, up to five or ten tons weights, are likely to have a fairly good conception of their magnitudes; but if they are not familiar with larger weights, either by moving them or trying to appreciate them mentally, all beyond that is merely indefinitely large; it makes but little difference in their minds whether you say twenty, fifty or one hundred tons.

Many mills for textiles are now made 100 or 125 feet wide, and in good practice they are well supplied with natural light — better than many narrow mills, in the building of which the importance of this matter has often been strangely overlooked.

Light from combustion is comparatively poor and costly. Where much of it is used for several hours in succession, as in large and poorly-windowed weaving-rooms, for instance, the vitiation and overheating of the air sometimes approach closely to the point where operatives of ordinary stamina can barely exist but have no vigor left for work. Doubtless their ability for work the next day is also lowered by this; often, also, by the colds taken on going out.

The superiority of electric-lights in this respect is one of their great advantages.

To secure good natural light in a wide mill, the stories must be high and the windows large, occupying forty per cent or more of the side walls, and leaving but little width of brickwork between them. Just above these tall and narrow masses of brickwork carrying the whole weight there must be large cavities in the walls to receive the beam ends. These conditions call for well-built walls of good thickness. As ordinarily made, such walls settle together considerably, and this must be taken into account if one wishes his upper floors (supported partly on the walls and partly on columns) to remain closely level. Window-sills are also more likely to be cracked, but this can be wholly avoided, of course, by proper precautions. If window-frames are built-in tightly the pressure forces the stools down at the ends and leaves them bent up in the middle.

Perhaps a few words ought to be said here on the controversy between high and low mills. All must admit that the objections to heights of six stories or more are of considerable importance, though diminished by having a good number of stairways, well located, and by automatic sprinklers, etc. As we are all aware, the case for one-story mills has been urged with the greatest vigor and ability here in Boston; but, probably, the great majority of manufacturers think the relative merits, as a whole, of this style of mill have been overestimated, and do not believe that the balance of advantages generally rests with it. But however this may be, the agitation for some reduction from the old extreme heights is a good and useful one. In practice, however, the decision as to the number of stories must often depend largely upon the exigencies of the location, the character of the business done and other special circumstances.

One of the most satisfactory reforms ever introduced in the construction of mill buildings was the getting rid of all hollow spaces surrounded by woodwork. This improvement was begun fifty years ago or more by throwing out the old-fashioned floor-joists with lath and plaster under them and substituting the solid floors now in general use; and it was advanced a long step farther about thirty-five years ago by dispensing with steep-pitched roofs and substituting flat ones covered with felt, pitch and gravel. These steep-pitched roofs made bad fire-risks, at the best — very bad as ordinarily finished — and they were objectionable in other respects. At first the flat roofs were made with one-inch boards, requiring supports by joists not over two feet apart. A few years later, planks and beams were substituted, making the construction substantially like that of the floors, excepting the slight slope required. I understand that a member of this society designed roofs of this kind over thirty years ago, and began to build them in 1861 or 1862. It seems that the same idea occurred to others independently at about the same time. Like many other good things, it seems simple and obvious enough now; but no one acquainted with the subject can compare the steep roof and the flat one without a feeling of satisfaction amounting to positive pleasure at the superiority and fitness of the latter, in every respect.

DISCUSSION.

MR. EDWARD ATKINSON. — The danger of laying the top floor so close as to strain the walls by expansion of kiln-dried top floor has often been considered and guarded against. I am somewhat surprised by the statement made by Mr. Sawyer in regard to planks shrinking lengthwise so much as to tip the posts. Such a case has not come under my observation in a way to attract my attention. I have been in consultation with our Mr. Buck for the last month, in devising some method of adjusting posts by other devices in place of the pintles. . . .

There is yet a great margin for the work of the engineer. There is one problem to which I wish to call your attention. I brought it before the cotton manufacturers many years ago; to wit, the preparation of the air in summer as well as in winter. It is a singular fact that by a process of natural selection — probably without knowledge of the reason why — there are not now many cotton spindles in Manchester, England, where the art was first established. Many of the old mills are dismantled, and nearly all the spinning-mills are now along the crest of a ridge about 800 feet above the sea level at the edge of the moors which stretch away to Scotland. At that point the humidity brought in by the Gulf Stream is condensed, and while the rainfall is little more than one-half of that of New England the humidity is constant and very even. It is upon that that the work depends.

Many years since I suggested the preparation of the air, which serves only as an instrument for carrying moisture, prior to its introduction into the slasher of the cotton-mill, by passing it over ice so as to cool and dry it, and thus put it into condition to take up a great volume of moisture without being heated above 120 degrees Fahrenheit. If the cotton or woollen fibre is subjected to a heat above 120 degrees Fahrenheit, it is apt to become brittle. I also ventured to suggest taking the air for the spinning-rooms from the outer end of the tail-race, especially in the dog-days, so as to bring into the mill the air which had gone down with the cold-water, washed and reduced in its humidity to the point of temperature at which it may be found in the wheel-pit. An experiment in this direction is just now being made for the first time within my knowledge. Something corresponding to this was adopted by our Mr. Wm. B. Whiting many years ago, when he was a manufacturing agent in the mill of which he had charge, with good results. But we are very near the point where we can make the cotton-mill *a sanitarium!* The ammonia method of reducing the temperature of the summer air below the freezing point is now in common practice in breweries, cold-storage houses and meat-packing establishments. I am investigating this subject, and have lately put a plain question to one of the large machine-shops in the West where they make the ammonia cooling engines. I put the question in this way:

"At what price will you lay down a plant for furnishing a cotton factory 300 feet long, 100 feet wide, four stories high, twelve-foot post, with a constant volume of air at a uniform temperature of seventy degrees throughout the summer months, such air to carry the amount of moisture short of saturation which air at that temperature is capable of holding in suspension."

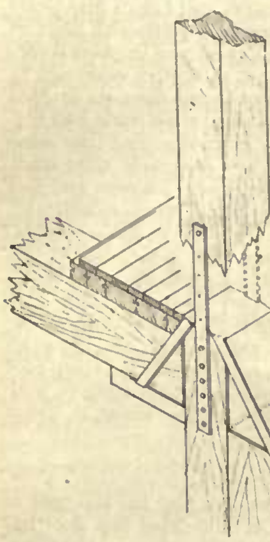
The proposition was received as if it were entirely commonplace, and they stated that the plant could be put down with all the fittings for $15,000. I am now following it up to see what it would cost to operate the machinery. I think there is a great field here, not only in the preparation of air and cooling it in the cotton-mill, but in all sorts of works, in offices and in dwelling houses, etc. . . .

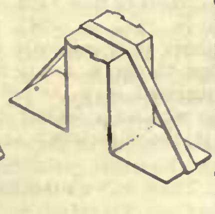
We observe to our cost that nearly all existing arrangements for the adjustment of posts one above another are faulty, for the reason

[1] Obviously, this is not the best form for economy of iron, but the difference in cost is unimportant.

that if a single column is broken, as iron columns are apt to break under fire and water, or if a wooden column is burned, or if a part of the floor falls, the key to the whole structure appears to be destroyed or endangered. The strain upon other columns by the removal of a part of the beams, leaving the slender pintles unsupported at the side, weakens the whole structure and is very apt to be the cause of great damage to or of complete destruction of the mill building.

I now venture to submit a crude study of the adjustment of posts each to the other in two different ways. In this adjustment I have tried to keep all the contingencies in mind.





The head of the lower post is carried above the level of the floor, so as to lift the base of the next post free of the wash-water. The floor-beams rest in an iron saddle, which, in one diagram, is braced at the sides; in the other, probably the better method, it is braced by an iron bar carried over the top of the saddle between the ends of the posts, and cut into the end of each floor-timber, if single timbers are used, or between the two pieces, if the beams are in two parts. This saddle, being made a half inch wider than either post, will have a slot cut at each side, through which slot a vertical strap of iron is to be carried, which is to be bolted to the two posts.

This is a mere suggestion. It is held by some mill constructors that the present base, cap and pintle constitute a better mode of construction than any saddle that can be made, and that no change in modern practice is called for.

It is also held by others that when floors or beams are so injured by fire as to endanger the posts, it would be better that all should fall together.

A dog may be introduced in the saddle by turning up a part of the end, or in any other way, so as to catch on the underside of the timber where it rests upon the saddle. Underneath the stirrup, which is exposed upon the underside of the floor-beam which rests therein, a two-inch plank may be fastened to protect the iron from the heat of a fire, or additional strength may be given by placing a hackmatack knee under the stirrup, so as to strengthen as well as to protect it from heat.

The end of the floor-timber cannot well be rounded, as it may be where the end of the timber enters a brick wall; yet I think this construction, braced as it would be in every way, would stand, even if the floor on either side of it were burned away, or if the next post were destroyed.

I submit these diagrams merely as studies, subject to criticism and suggestion, and shall presently have all the stresses computed.

I think a good deal of work has yet to be done in the application of hackmatack knees to the support of floors. They have several times been introduced into high and narrow mills at our suggestion, in order to stiffen them, but have not yet been used to any great extent in original construction, except in one-story factories.

MR. C. J. H. WOODBURY. — Another defect of construction, occurring in storehouses more frequently than in mills, is placing wooden bolsters over the columns, instead of iron caps and pintles. The transverse contraction of these large beams in the process of seasoning varies from three-eighths of an inch to double that amount, and, therefore, throws the floors of the building out of level to that measure, and the error is a cumulative one from story to story. There is also a liability of compression of the beams when supported directly on columns, as the experiments for the Factory Mutual Insurance Companies on the testing-machine in the United States Arsenal, at Watertown, showed that the resistance of timber to transverse compression was about one-third of its resistance to longitudinal compression, and, therefore, the cap on the top of a wooden column should spread out to sustain an area of timber three times that of the end of the column.

While at Geneva I saw a watch factory under construction which was being built of iron and concrete, the motive being similar to that of the design of the iron mill exhibited to you this evening by Mr. Grinnell, although the method of carrying out the design was far different. The ends of the mill were of stone, and the walls of upright I-beams extending between the windows, and of concrete from the windows to the floor. The floors were made of joists placed between the I-beams and the boards covered over with cement. The iron window-sashes were fixed, but a small portion of the upper sash would swing for purposes of ventilation. The roof of this mill was a square roof consisting of tiles resting upon a joisted frame and inclosing a hollow, unused attic. The partitions through the mill were made of tiles set on edges and joined together with plaster-of-Paris.

There did not appear to be any controlling system of mill-design in proportioning and arranging a building for the specific use of manufacturing in the manner customary in America.

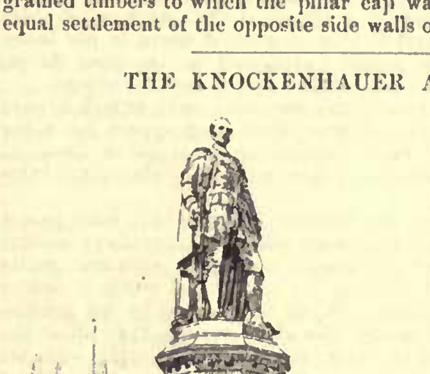
MR. STEPHEN GREENE. — In the few moments I may take I may simply touch briefly upon one or two problems in mill-engineering. One of the somewhat difficult problems we meet in mill-construction is to secure a satisfactory floor, where no space can be allowed beneath. Our experience has taught us that the most satisfactory results can be obtained in such cases by first laying a concrete composed of gravel and coal-tar materials, and upon this completed surface lay plank either of hard pine or hemlock simply fitted together. Upon these plank, which should be no less than three inches in thickness, the top flooring may be laid and should be laid across the plank. The cases are very numerous where floors have been laid upon concrete and have completely failed. The cause in nearly every instance has been due doubtless to the inserting of timbers in the concrete, to which the planking has been nailed. This method is to be condemned, as it allows dampness to enter, which insures a speedy destruction of the floor.

MR. JOHN R. FREEMAN. — Among the interesting points brought out by Mr. Sawyer's paper on mill-engineering is one which may well serve as a text for more extended comment, and to which the attention of some engineers and architects should be forcibly directed.

I refer now to his illustrations of the fact that by the seasoning of timber in an extended floor a distortion is liable to occur, and often does occur, which may draw certain of the pillars out of the perpendicular slightly, but yet enough to materially change the condition of the application of the load, and to force the bearings at the ends of pillar out of the condition of evenly distributed contact into the condition of contact all near one side.

I have myself seen numerous instances where this has actually happened, and where unquestionably the load was all applied to one side of the centre. Not only have I seen this uneven bearing caused by the endwise shrinkage of long stretches of plank-flooring in factories, but also in a few instances by the twisting of heavy cross-grained timbers to which the pillar cap was bolted, and also by unequal settlement of the opposite side walls of a mill.

THE KNOCKENHAUER AMTHAUS.



Monument to the Prince Consort, Finster Lawn, Dublin.

WITH a perfectly constructed model of the façade of the Knockenhauer Amthaus, the Willard Collection possesses a specimen of one of the finest of German types. This elaborately carved and decorated timber building of Hildesheim is among the most remarkable of its class throughout Germany in its combination of ornament and constructive features. The reproduction of this celebrated work for the Metropolitan Museum of Art, is at one-tenth scale, with coloring as in the original. This model was made and finished in polychromy, by Herr Küsthardt, a sculptor and archæologist of Hildesheim, who was employed by the town a few years ago to repair the damages caused by a fire and whose carefully measured drawings and sketches made at that time facilitated an accurate reproduction.

In technical character the Knockenhauer Amthaus is esteemed by architectural archæologists as an exceedingly perfect work of art. Through its growth from the Gothic, this edifice shows a profile for the greater part of that period. For the German artist's *ornamentik*, fancied as the animating element of the construction, its forms with few exceptions are taken from the Renaissance at its richest stage, or when it showed the highest product in wood-carving, with all the niceties and beauties of such work to be perceived only through careful examination. The building is thus between two periods, not appearing harshly united in it, but with the whole well-harmonized. With the decoration left to the Renaissance, and with such severity expressed in the Gothic construction as is suited to the character of a wooden building, the unity of impression is not lost. According to competent opinion the observer finds it difficult to recognize the presence of two different styles.

The question is philosophically considered by Karl Lachner, how

it was possible without any intermediary movement that the finest and noblest forms of the Renaissance with the Greek character could have been brought into such combination. In his learned discussion of the subject, this author reviews a certain interesting story, by Dr. Seifart, in his "*Blätter und Blüthen,*" of a man of Hildesheim who had acquired the mastership of art in Nüremburg from Veit Stoss and who had shown the great force of his ability in this edifice, and concludes by informing us that it is all a fiction. Of the names and lives of the great artists engaged upon this building nothing more is known, as he insists, than of others in that city. An account in complete detail of the great structure erected in 1529 by the guild of the butchers, is contained in "*Die Holzarchitektur*" of this accomplished scholar.

As explained in that analytic review, the edifice received the name "Amt-haus" because the combined societies of the shoemakers, tanners, bakers and butchers for whose use it was built, had the name "courts" in contradistinction to the "guilds." These courts had special privileges granted to them by the bishops of Hildesheim in the thirteenth century. In connection with the guilds they alone had the right of electing the officers of the city, the courts having always precedence and the more extensive rights. Their dependence was on the bishop for approval of these rights and only in a slight degree on the council of the city. The esteem of the courts was so high that the "Geschlechter" did not hestitate to join them. As the guilds endeavored to beautify their houses, so in a far higher degree the courts determined to do the same.

In the principal situation of the city, opposite the Rathhaus, the courts of the bakers, tanners, shoemakers and butchers, erected their fine building, excelling even that of the councillors of the city; but this did not meet all the wants of the societies; in two different places other large court-houses were built, thus showing the extent of this element with the citizenship. One of these buildings, erected in 1570, yet stands; the other, erected in 1541, was destroyed in 1881, by fire. The emblems in each were different. The principal court-house, on the Marktplatz, received as an emblem a figure of the Lamb of God carrying a flag, significant of the near relation of the court with the church. The building on the Andreasplatz had as an emblem the head of an ox on a shield held by two spearsmen, which, still preserved in the museum, shows that the period of the Reformation had already commenced, as the signs of the Church had disappeared. The third building on the Burgstrasse is thought to have had most probably a representation of Maria Magdalena as its emblem. The court of the shoemakers and tanners had also two buildings, one, with the so-called shoe-court, stood where Gerstenberg Brothers now have their bookstore; the other, built in 1595, stands yet on the bridge over the Innerste opposite to the Johannes Hospital. Its situation on the water was necessary to the trade of the tanners. The court-house of the bakers on the left-hand side from the court-house of the butchers was torn down in the last century.

On the Marktplatz remains only the court-house of the butchers (Amthaus der Knockenhauer) once also in danger of being torn down. From the use of the building for all kinds of storage the interior was greatly damaged, and so led to the suggestion that it should be put out of the way; but finally through the influence of Senator Römer one of the best works of German art has been restored. In 1852, it was bought by the city, and at the same time renovated in the most successful manner. The old painted panels were presented to the Museum, and new ones, painted in the style of the sixteenth century, replaced them. The building now contains the city savings-bank institution and the public library.

The plan has been somewhat changed with the renovation, both in the arrangement of the different stories and of the staircase. The first story formed a large hall for the assembly of the courts. In the higher stories were, partly, apartments for residence, partly large magazines, which were used by the associations. A winding staircase in the northwest corner with very low stairs led from the basement to the upper stories. This was torn down and a double-armed staircase erected. Of the furniture, a kind of case or cabinet painted in bright colors has found a place in the Museum. Very interesting was the plan of the lower story, of which the hall, remaining the same, and having a width of 2.45 metres, runs through the centre on the street level. This connects the market-place with another smaller place, the Hoken, separating the building throughout its depth into two distinct halves, and seeming to have served as a thoroughfare. At the present time stores are on both sides. Formerly the rooms opened from the hall, which are now closed in that direction, and divided into smaller so-called *fleisch-scharren.* In these the butchers had their stalls. The arrangement in trap-construction and sliding windows was ingenious. Stores of the present kind were unknown, in place of these being the *scharren* or booths, erected in the court or guild houses, or near them, in a fashion still to be seen at Frankfort-on-the-Main, where butchers occupy whole streets with booths close together.

Under the ground-floor of the Knockenhauer Amthaus were large cellars, forming cool preserving places for the meat, but for killing the animals no room was provided in the building itself, a slaughter-house, as is thought probable, being next it.

On the corner of the Rathhausplatz and the Marktstrasse, this edifice offers two different views. One of these is the gable side toward the Platz, of which the Gothic construction shows slight changes from the original with its stone foundation. The lower story is 3.40 metres high. An intermediate story is not divided by the hall. Above this is the first floor, with high rooms nearly 3.5 metres high, and the second story has a height of 2.5 metres. Two more stories, projecting on the gable side, are somewhat less in height. Finally, the triangular upper portion of the elevation, also projecting, contains two more stories. The piers and columns of the ground-floor extend to the first story. The construction of these with three-cornered moulded forms of ornament is entirely Gothic. On each lower corner pier are three-fold caps forming an angle at the corner. The ornament of the upper parts of the columns was originally carved with Gothic profile, which apparently did not satisfy the decorator, and heads were carved and applied at the tops afterward, but not covering the whole, and the Gothic profile may be recognized on the sides. The Kopfbund is a capital of Gothic form, but with ornament executed in the style of the Renaissance, and in a similar manner a modification of the Gothic is shown in horizontal bands of carving of rich character. The same idea of connecting figures with foliage is translated in the language of the Renaissance in a finer style than elsewhere. With the exception of the capitals and the window profiles, everything is Gothic, this motive being most pronounced on the side toward the Marktstrasse, showing beautifully-executed ornament of foliage. On either side, the lower horizontal band is covered with symbolic representations, with a height of a little over thirty centimetres; at the limits, the emblem of the Amthaus, the Lamb of God, holding a banner with one foot. On both sides the ends of the beams are visible, the space between the emblem and these parts of the beams being covered with two eagle-heads. On the left-hand side of the emblem is a humoristic scene: two little angels are seated on ornaments in the forms of fishes ending on the one hand in an eagle-head and on the other as foliage, the whole giving an impression of ridicule of the old tournaments. Then follows the killing of an ox: the butcher holding the axe rises out of a spiral, and is associated with another figure of a man who holds a long knife in one of his hands, and in the other hand the tail of a winged griffin. On the opposite side of the griffin appears the figure of a man terminating in a spiral formation, who spears the griffin, who tries to defend itself with one of his fore-claws. A neighboring winged figure analogous to the former blows a twisted horn, forming the last of the series. In the centre, the monogram of IHS, carved on a shield, is held by two chubby angels, and on either side of these is another angel with an ornamental trombone. The other half of the series is symmetrical with this in composition, but with figures differing somewhat from those of the first part, as, instead of the player on the trombone at the left, is at the right a drummer. The next figure in connection is armed with a shield, and is sending his spear into the mouth of a griffin held at the hind-claws by another standing figure, and the final scene shows the cutting-up of oxen. The forms of the leaves are small, and yet are so distinct as to be visible from the street, and with lines extremely perfect. Special notice has been taken of the effect of the reeds, and not less of the outlines and the ribs of the acanthus leaves, which appear for the first time in this type of German building, and which are compared with similar Greek forms.

The heads of the figures are so lifelike, the whole division of space is executed in so masterly a manner, that these works have been pronounced without hesitation to be the most excellent of all times of art. On the upper stories are found also the acanthus leaves and a kind of rose leaf, the forms of these, on account of their greater distance, being in a little stronger relief. As a remarkable feature, the ornament combines naked human figures not found before in Gothic plastic, leading to the expressed belief that the master who dared such production at that time must have had a high rank in order to break with old traditions, and that he could not have learned his art in his own city. Of these figures, the greater number of angelic ones stand amidst foliage with musical instruments of varied sorts. Mingling in the ornament are forms of fruits, flowers, animal and human heads. The panels contained heads with Gothic foliage painted. On the right hand of the gable side was a four-cornered construction of iron rods projecting toward the street, supported by an ornamental form in iron. On its ends were borne pans that served for burning pitch-wreaths at festivals in order to light the whole place.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

ENTRANCE TO THE WESTERN RESERVE MEDICAL COLLEGE, CLEVELAND, OHIO. MESSRS. COBURN & BARNUM, ARCHITECTS, CLEVELAND, O.

[Gelatine Print, issued only with the Imperial Edition.]

BUILDING AT THE CORNER OF BEDFORD AND KINGSTON STREETS, BOSTON, MASS.

It was in this building that the great fire on Thanksgiving Day started. See "Lessons from the Fire," elsewhere in this issue.

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. H. L. WARREN, ARCHITECT, BOSTON, MASS.

HOUSE FOR F. J. HECKER, ESQ., DETROIT, MICH. MESSRS. SCOTT, KAMPER & SCOTT, ARCHITECTS, DETROIT, MICH.

THE ALGONQUIN HOTEL, ST. ANDREWS, N. B. MESSRS. RAND & TAYLOR, ARCHITECTS, BOSTON, MASS.

PROFESSIONAL CONQUEST.[1]



Doorway at Dantzic. From *Architektonische Rundschau.*

THERE is a field for professional conquest in view. Its acquirement will be fraught with perplexities and difficulties. Its occupation is imperative, if the architecture of this country shall soon be up to a creditable standard of merit. The building enterprises of the country, so far as all work of a public character is concerned are in the hands of, and directed by persons who have no special qualifications to determine either what should be built, or how it should be done. When a building is to be erected, instead of its being the custom to have it controlled by architects of the country, or by some persons skilled in building matters, it is usually put in the hands of a board or committee from which all architects are carefully excluded.

To introduce a different practice, and by this means make it possible to eliminate the faulty, systematize, harmonize and improve upon the meritorious in our public architecture, is a field for professional conquest. It is a field worthy of our best efforts to control. It can be gained only by sacrifices commensurate with the importance of the expected result.

Designs for buildings are secured either by competition or otherwise. For the present and likely for many years of the future, a considerable share of our public buildings will begin their career through competition of one kind or another. As now conducted competitions are not only not conducive to the highest achievement in the architectural sense, but are an incubus upon the profession. The excuse for keeping up the practice is two-fold: First, to give everybody a chance, to afford the younger members of the profession opportunities to measure arms with those of greater experience and reputation. Second, to obtain for a given building the best possible design. As to the first, the profession will not object to a decrease in the number and an elevation of their standard. As to the second, conducted as they are, the object sought is not attained. The chance to select a better design than any given one obtained without competition, is lost by reason of the fact that the average commission which makes the selection is not qualified to determine which design should be selected. I speak, of course, of the great number of competitors which constitute the rule, not of the few exceptions where experts are called in and designs submitted under a nom-de-plume. I think it is fair to say, as a rule, that if the best design in a given lot submitted be adopted, it is an accident rather than a likelihood. The buildings for which designs are obtained by giving commissions direct, to a certain extent escape objectionable results of competitions inasmuch as there is usually free and full interchange of thought between the architect and those in charge, and by means of this, the architect has a more favorable opportunity to control the whole character of the enterprise than where its general outlines have been made up as a target for the competing designers to shoot at.

The whole system of placing the management and direction of our buildings in the hands of persons who possess no special qualifications for it, whether they obtain designs by competition or otherwise, is a mistake. It is a wrong against the public itself, which we are professionally bound to right as soon as we can reach the ear of those who control such matters. The average board or commission is made up of intelligent men in other lines of vocation, and if called upon to decide anything in relation to their own business could do so with a fair prospect of having it properly and correctly done. But when the plan for a building comes before them, no one of an average board can tell whether a building erected after the plan would please him or whether it ought to please him. No one of them could tell whether it is probably the best thing which can be done or not, — and no one could tell, if it was the price of his eternal salvation, whether a building erected after the plans under examination, would stand up or fall down. To say that this is ridiculous is to characterize it in terms entirely too mild. What commission anywhere without legal talent would undertake to decide a question of law? What board without obtaining a physician would be willing to decide a question of medical jurisprudence? What commission without a musician would undertake to decide whether a piece of music had been rendered perfectly or not?

What man anywhere would be willing to either give or accept such authority, and with it the responsibility in any of these matters? How different the whole face of affairs when you come to the subject of architecture. The public believes it necessary to grant, and those selected think it proper to accept, such responsibility. The result is what would be inevitable if the same lack of business sense should be exercised in any other direction. If you answer that these boards either by competition or otherwise, engage an architect, and trust to him and depend on his ability and judgment, then I will ask you, what is the use of the Board? Why intrust a commission with something everybody knows it knows nothing about, instead of putting it into the hands of people who could reasonably be expected to understand what was before them? If there is any use of having anybody but the architect rule over the matter there is use in having somebody who can be an aid to him instead of a hinderance. If, in order to have done the best thing which can be done, it is necessary to procure assistance for the architect, it is certainly proper to have such assistance possessed of some idea of what should be done, and what a given plan and specification will bring out when carried into execution.

It may be claimed that the architect does control the whole matter so far as the builder is concerned, that the board or committee is only expected to attend to the formalities and the business part of the work. I dare say that in some few instances this is true. If it was always true, one of the objections to the present system would be removed, such cases are rarities, by no means the rule, when the architect is left free to use his best judgment in all things pertaining to the building. If in all cases of competition the designs were selected by a board of competent experts, and where an architect is employed his design should be his own, not that which will please the committee, much of the harm would be avoided. But even then, the benefit of intelligent counsel and advice which would be valuable to the greatest architect in the country and still more valuable to the younger members of the profession — would be lost. No man anywhere is so omniscient that his work would not be better for the criticism of a board of men of his *own* profession, even though something less than himself in ability. This would be gained under the system I suggest. Upon the other hand the work of the weakest member of the profession is not likely to be improved by the suggestions of the average board. This contrast measures the difference between the present system and the state of affairs after this field shall be won. Again, in the last twenty years much has been done to unshackle the hand of the designers, but this same unloosing of bands turns him into a field chaotic with historic design which is to supplement and guide his invention in the work of the future.

One of us gleans from fields of certain ideas; another, other ideas; another, still other ideas, each following a tangent for himself; some learning better than others, but nobody learning so much as all.

If we are to have a national style these lines of divergence must be brought to a parallel; the simply odd, the uselessly picturesque, the servility of copyism and the sterility of unstudied crudeness, from the work of each, such must be excluded.

Our work must tend toward a crystallization of the best to be found or invented. If this be true I know of no one thing which would be a more potent agency in its accomplishment than the adoption of this plan.

The use of boards instead of individual experts and counsellors will broaden criticism, give decisions a greater weight of authority and rid them of any supposed bias in favor of, or against any particular style.

The one great fact that the final authority as to what shall be done on our public-building enterprises is left to such persons as now control them, accounts to a very large extent for the blunders committed and accounts for the fact that the grade of our public architecture is not up to what it should be. So long as it remains in such hands it can never occupy that position in relation to the architecture of other countries to which it is entitled. I take it as indisputable in the interest of our profession — the interest of architecture of the country and the interest of the general public that a great change is desirable in this whole matter. But how can it be brought about? All may recognize that we are in the woods, but who knows of a pathway that leads to the sunshine? All can recognize the great work to be done, but who is able to cope with the difficulties we shall encounter in doing it? The present system is strongly entrenched in public favor. No matter how willing a public official may be to acknowledge his inability, he is immediately offended if some one suggests that a professional adviser be called in, and if he should even consent to that, he is quite sure to have it understood that it is only *advice* and not final *judgment* which he accepts.

An architect going into competition will ordinarily greatly jeopardize his chance of success by mentioning to a member of the board the fact that he would be glad to see the designs submitted to

[1] A paper read by J. W. Yost, architect, Columbus, Ohio, before the Convention of the American Institute of Architects, at Cincinnati, November 21, 1889.

a board of experts for decision. There is much more than merely the question of deciding which of a given number of plans shall be accepted which should not be in the hands of boards without education in matters of architecture. The control and management of the entire enterprise, everything that is included in the words "How to build, when to build, what to build," should be left to the control of the profession entirely, not merely submitted to them for advice and clerical services. The idea of an architect preparing plans for a commission of architects and submitting plans in competition for a board of architects to decide upon, may be a new idea, but it is a good one nevertheless.

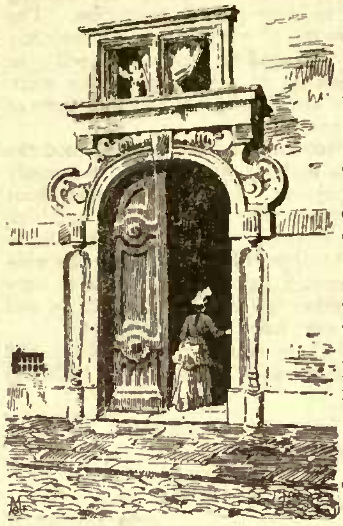
If an important building enterprise, it is necessary to have an architect of skill and ability, it is by no means improper to have the value of his services supplemented by the advice of men who know as much about what is to be done as he does. It is written that "In a multitude of counsel there is wisdom," and matters of architectnre were not excepted from the law. When we undertake to improve upon the present practice we are at once confronted with difficulties.

The matter of expense must be taken into account, boards of professional men who make their living by their calling are not likely to render services such as described, without just compensation. The public is just beginning to appreciate the fact that the five per cent paid for the service of an architect is money well expended, but it will take some little time to bring the public to believe, that two or three per cent more can be paid out to advantage in securing the service of such boards as I have described. We must establish the fact that this additional expenditure is, after all, a great economy, before the public will be likely to accept it. That it will result in not only bettering the architecture but actually saving money, is as clear as anything need be, when all the facts are considered. It will, however, take some money out of public officials who heretofore have acted in charge of building matters, and they will seriously object to having it done.

I see, however, no insurmountable difficulties in either of these directions. We have brought the public up to believe, and that within the space of a few years, that their interests are best subserved by employing a competent architect, even in small enterprises, and in less time we could demonstrate the economy of the practice I have suggested, and through the pocket-nerve of the public, could compel officials to accept the situation. There are, of course, boards in charge of new buildings who render their services, such as they are, without hope of financial reward; but even then it would be entirely within the range of possibilty, even probability, that a board of competent persons could save in the actual cost of the building, to say nothing of its value when once erected, much more than the probable two per cent, which their services would cost. But how are such boards to be found? Who is to select them and who shall be ready to serve when requested? At first the question seems difficult, and, in the present state of our profession, next to impossible, to answer. But we are not at a "stand still." Every demand for such service would in a few years be abundantly met. If you ask me now to name the persons who shall serve in this capacity, I am not able to answer you. I think it must be frankly admitted that at this time there is no set of men specially qualified for and desiring to hold such situations, but open the way for such work and the time will be short until the supply will be equal to all demands. It will be impossible now to lay out any plan for carrying these ideas into effect which shall not have to be altered to meet future requirements as experience develops them. I think no man is wise enough now to foresee all the difficulties, which might arise in undertaking to substitute professional for non-professional authorities in building matters. Judging by the experience of the past it will be some years before we could perfectly carry out the reform. But we are growing in that direction.

I know that we have no national style of architecture, no complete harmonizing of views as to what direction the detail in our design should take. I know we have had too little personal affiliation with, and too little friendship for each other, particularly in the newer portions of the country. I know we are unmerciful critics of each other's work — of everything not in accordance with our individual ideas or the vogue of the time. But for all that we are fast becoming less biased in our judgment and more reasonable in our treatment of each other and of each other's work. We are rapidly approaching a toleration of differences of opinion. We are speedily coming to realize the fact that if we have no respect for each other and the work of each other, the general public will have still less for all of us. Some of us may not take kindly to criticism; others may be disposed to resent the criticism of a professional board as an intrusion upon the "sanctum sanctorum" of the designer. Some of us may prefer to be allowed to convince an ignorant committee of the superiority of our ideas, some of us may not think any one else ought to have the impudence to make a suggestion in regard to what we have in hand, but all these cases will be rare, and as criticism becomes more intelligent and the members of the profession are brought up to entertain a better feeling for each other, they will practically disappear. As we become better educated and more skilful in our own work, we will be still more able to recognize merit in the work of our brethren. When we shall possess sufficient professional patriotism to see our highest personal advantages in the greatest possible improvement in the architecture of our country, a foundation will be laid upon which we can build our work and ourselves up to the standard of the old masters.

SOME LESSONS OF THE FIRE.[1]



Doorway at Dantzic. From *Architektonische Rundschau.*

THE crude memoranda that I have been enabled to make in the brief time available are not offered in any hope of instructing, but rather as suggestive points for fuller and abler treatment by others. In speaking clearly to the purpose, it is impossible to avoid some strictures on the work of members of our craft, both living and dead; but they are made simply as a necessity, and in the broadest spirit of charity, and with a full knowledge that under like conditions the same results might have followed in our own work. How far in the buildings in question the architect may have been limited in expenditure or interfered with in arrangement and construction we neither know, nor is it for the present purpose at all essential to inquire.

In view of the weight of responsibility hanging over us, architects should be the last to be hypercritical or censorious of each other. It is a matter of regret that the reverse is too often the case. No one with a long record of practice but has reason to be thankful if no great loss of property and no loss of life can be laid at his door, for in these matters it is not always the careful and conscientious that avoid censure.

The relations of the architect to the public are peculiar. He is the paid servant of his employer, but he is also in a certain sense the unpaid servant of the people. At any rate, he is liable to be held so the moment he endangers their lives or property. It is, therefore, most important, even from a selfish point-of-view, that we should unite in the protection of each other against all injustice or oppression; that we should labor incessantly for the education of the people in matters relating to building; and that we should earnestly promote a public sentiment, whether it take the form of written or unwritten law, that shall favor all reforms in construction and condemn all innovations that are dangerous or in any way an invasion of popular rights. And this must be done at some expense of time and money, and often at the risk of personal sacrifice. All new things are not necessarily improvements, and a step backward may sometimes be better than one seemingly in advance. All true progress is slow. There is a certain general average in nature and art. The greatest are not so very far above their fellows, the least not so low as to be altogether contemptible. There is no art whose sure steps have been slower than the art of building. There is none where all extravagances are more certainly condemned within reasonable time. Too often the inexpediency of wrong methods is emphasized by some great catastrophe involving loss of life and property, and such an one has been brought home to us with peculiar force during the past week. In the fire of November 28th the loss in money was about three and one-half millions of dollars, but, worse than that, the lives of several of our gallant firemen were sacrificed by the falling of walls that should not have fallen. Indirectly, as citizens, we shall suffer our share of the general loss, but directly, as a body, we are far greater losers. We are held responsible for methods of building proved to be hazardous, and assumed by many to be the best we can do at any reasonable cost. It is only by the prompt and full instruction of the public, and by taking an immediate lead in measures for improved construction, that this stigma can be removed.

It is not enough that we expended time and money liberally to procure for the community the present safeguards in the shape of statute law. We must labor incessantly for further improvement, and must not be content to keep abreast of the times, but to strike out new paths and lead in all methods for improved building.

Let us consider briefly the construction and arrangement of the buildings destroyed, and especially the one in which the fire started, the nature of their contents and the progress of the fire.

The Brown-Durrell Building, on the southeast corner of Bedford and Kingston Streets, had an unbroken floor-area of 23,000 square feet, and was six stories, or about eighty feet, high. Bedford Street, at this point, is forty feet wide, and Kingston Street fifty feet wide. The ceilings, including girders, were plastered on wire-lathing, and there were the fire-stops called for by the law. The floors were supported by unprotected iron and wood columns. The entire front was of granite backed with brick, but the two lower stories were practically all glass, the four stories over being supported by two stories of cast-iron columns and slender granite piers connected at the top by cast-iron girders. These girders were veneered with granite on the face, and protected on the back by brickwork and underneath by plate-iron. These were objected to as a constructional feature by the Inspector of Buildings before their use, but after tests, by loading only, they were used. To the surprise of

[1] A paper read by Mr. John A. Fox, at the meeting of the Boston Society of Architects, December 6, 1889, and printed in accordance with a vote of the meeting.

most experts, they show no signs of being seriously injured by the heat, which may, perhaps, be owing to the collapse of the building at an early stage of the fire and to their partial protection. The second, third and fourth floors were stored with what are technically known as "small wares," skilfully arranged on counters, to sell — or to burn. These floors were connected at several points by staircases and light-shafts. There was also storage in other portions of the building of rubber and miscellaneous goods.

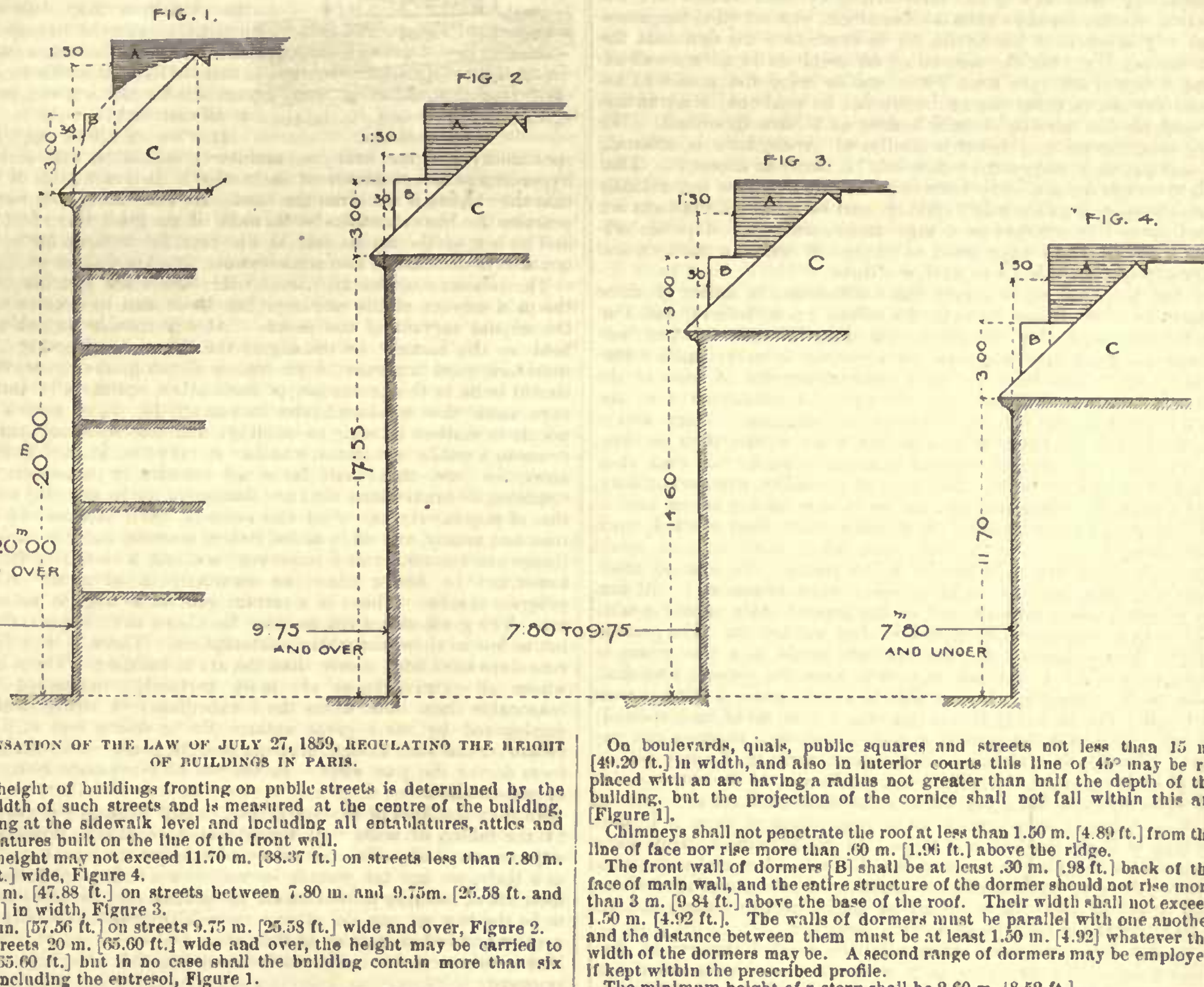
On the opposite corner of Kingston and Bedford Streets stood the well-known Ames Building. This building was massive and costly and of the mill-construction throughout. Its floor-area was about 8,000 square feet, practically unbroken. The roof was steep and high and slated. The front was of brownstone. Although more solid in its first and second stories than its opposite neighbor, still the wide arched opening extending up through two stories, and with only wood and glass filling, were altogether too large for its location and uses. The goods in this building were hats, hosiery, furs, etc.

Here we have the key to the whole situation. Extensive and unbroken floor-areas piled with inflammable goods. High buildings

allowed to override too much the immediate objects of architectural effect or practical convenience for working" — which is about the same line of argument used against all measures of safety requiring trouble and expense. Of course, Captain Shaw looks at building from the point-of-view of a specialist — but he is of the sort of specialists to whom people are disposed to listen.

A leading insurance authority estimates the gross fire-tax of the United States, including fire-departments, insurance expenses, a part of cost of water-works, etc., at a minimum of one hundred and eighty millions of dollars in a normal year in which no great conflagration occurs; and the actual loss at a minimum of one hundred millions. One-half of such a sum invested in building annually would be of considerable interest to architects. Is it not a matter of personal advantage, as well as of public spirit, when we lend efficient aid in reducing the fire loss?

What the English critic calls "practical convenience for working" is a bad suggestion to come from an architect in this connection. "Practical convenience," so called, is often the worst enemy of good architecture. It was this that on the Ames Building covered



CONDENSATION OF THE LAW OF JULY 27, 1859, REGULATING THE HEIGHT OF BUILDINGS IN PARIS.

The height of buildings fronting on public streets is determined by the legal width of such streets and is measured at the centre of the building, beginning at the sidewalk level and including all entablatures, attics and other features built on the line of the front wall.

This height may not exceed 11.70 m. [38.37 ft.] on streets less than 7.80 m. [25.58 ft.] wide, Figure 4.

14.60 m. [47.88 ft.] on streets between 7.80 m. and 9.75m. [25.58 ft. and 31.98 ft.] in width, Figure 3.

17.55 m. [57.56 ft.] on streets 9.75 m. [25.58 ft.] wide and over, Figure 2.

On streets 20 m. [65.60 ft.] wide and over, the height may be carried to 20 m. [65.60 ft.] but in no case shall the building contain more than six stories including the entresol, Figure 1.

The height of the ridge above the cornice shall not exceed half the depth of the building, including the cornice projection.

The profile of the roof on the street side shall not pass beyond a line running at 45° from the outside of the cornice [C].

On boulevards, quais, public squares and streets not less than 15 m. [49.20 ft.] in width, and also in interior courts this line of 45° may be replaced with an arc having a radius not greater than half the depth of the building, but the projection of the cornice shall not fall within this arc [Figure 1].

Chimneys shall not penetrate the roof at less than 1.50 m. [4.89 ft.] from the line of face nor rise more than .60 m. [1.96 ft.] above the ridge.

The front wall of dormers [B] shall be at least .30 m. [.98 ft.] back of the face of main wall, and the entire structure of the dormer should not rise more than 3 m. [9 84 ft.] above the base of the roof. Their width shall not exceed 1.50 m. [4.92 ft.]. The walls of dormers must be parallel with one another and the distance between them must be at least 1.50 m. [4.92] whatever the width of the dormers may be. A second range of dormers may be employed if kept within the prescribed profile.

The minimum height of a story shall be 2.60 m. [8.52 ft.].

The projection of a cornice shall not exceed the thickness of the wall at its summit.

practically opening into each other across narrow streets. And a fire fairly kindled before an alarm. The extent of the further spread of the conflagration was only a question of luck and pluck. The pluck that of our firemen, of course. And the luck that the flames were stopped short of the great retail dry-goods fire-traps, with their adjacent hotels and theatres, extending westward from near the limits of the fire. Given a cold night and high wind the $75,000,000 loss of 1872 might easily have been repeated.

Captain Shaw, of the London Fire Brigade, tells us that "the risk of a building is in direct ratio to its cubical contents," and he also lays particular stress on the element of height. He demands that buildings should have numerous partition-walls of brick, and that these should have good foundations and be well tied together at all angles by iron bedded in the masonry; so that practically the walls would stand intact after the contents and floors had burned out and fallen into the cellar. He also objects to the use of stone, when brick can be employed, and especially to stone ashlar and to all projecting stone balconies and cornices as extra hazardous in event of fire; and he is an earnest advocate of heavy wooden columns and girders. These and similar recommendations lead one of his English critics to assert that "the provision against danger from fire cannot be

hundreds of feet of Mr. Richardson's delicate carving with painted sign-boards. It is this that compels our façades of stone to be set on first stories of plate-glass entirely unprotected. And it was this demand that led directly to the false construction that toppled the walls of the "Brown-Durrell" building onto our devoted firemen.

It is high time that a line be sharply drawn, beyond which the convenience of trade shall not jeopardize the lives and property of one's neighbors; and that the essentials of construction shall be controlled by experts under the law. The experts' skill and art should be employed strictly within the limits of safety. If we wish the mechanic to supplant us on the one hand and the pictorial artist on the other, there is no surer way to such a result than neglect of our opportunities to lead in the art of building and to prove that usefulness and beauty can exist in perfect harmony in the same structure; and that all reasonable business requirements can be satisfied without the sacrifice of one to the other.

In the long struggle for such improvements in building as are embodied in the existing law, your representatives were constantly met by the assertion that such restrictions would discourage investment and injure all real-estate interests. It will be generally admitted that such has not been the case. "Mill-construction" has

steadily grown in favor, but it is somewhat difficult of adaptation to complicated structures, and is chiefly useful in buildings attacked by fire from within. That the law was not stringent enough we well knew, but all was obtained that public sentiment would then support or any ordinary system of inspection could enforce. But the time is ripe and the public is ready for another advance. A leading insurance agent calls for a limit of height to sixty-five feet and of room-areas to five thousand square feet: there were lofts in or near the fire of from 20,000 to 30,000 feet area. Strong hints are thrown out of heroic measures of self-protection by the insurance companies themselves. The foreign law, which makes the owners of a building in which a fire originates responsible for all resulting damages to others, finds some advocates. Unprotected iron-construction, especially girders and columns both interior and exterior, is universally condemned. And last, but far from least in importance to us, "Eiffelism" in building has received a marked check; and there is a fair chance that a law like that of Paris, proportioning all heights of buildings to the width of the streets on which they abut, may be enacted if vigorously pushed. And here let us for a moment consider the question why an individual should be allowed to erect a building of extravagant and hazardous height in a crowded neighborhood any more than he should be allowed to store dynamite or petroleum. We restrict materials, processes, uses and a hundred other matters; and yet we allow a section of the city to be half ruined that an experiment may be tried. It is the old story of the tyranny of the minority to which Americans tamely submit in so many other matters. Neither necessity, nor profit, nor convenience, nor safety, nor beauty, can be pleaded. If any one chooses to build such towers at a suitable distance from all other edifices there might be no sacrifice of public safety; but on narrow streets the law should afford immediate redress or compensation, as in the case of any other nuisance, and further movements in the same direction should be promptly checked. The evil would, no doubt, correct itself in time, but not until much injury has been done and money wasted. Even in locations where such structures could not prove injurious to the neighborhood they should be provided with their own fire-extinguishing plant, maintained under constant surveillance; the ordinary apparatus being of no service at heights of over about eighty feet and of not much at above sixty. Earthquakes are not often taken into account in our neighborhood, but an earthquake that would wreck a twelve-story building is by no means an improbable event. About twenty years ago Boston had a shake that on a fifth floor caused water in a pail two-thirds full to slop over. And there are, or were very recently, low two-story walls standing at the "North End" that were cracked, within two hundred years, by the same agency.[1]

Some of our soundest judges in real-estate matters consider that above six stories, or about eighty feet, the additional cost will not find a reasonable return in rents. Elevators have to run too fast and too far, with great wear and tear of machinery. The smoke and gas from neighboring chimneys will render the upper rooms almost uninhabitable at times, especially with the present tendency to the use of bituminous coal. Difficulties of foundation and general construction are seriously increased, and the neighboring buildings that are driven into the ground and overshadowed are impaired in value. Then such a structure is a serious menace if a fire occurs around its base, as a hot conflagration is almost sure to destroy iron and stone supports and bring down the great mass in ruin.

But it is hardly worth while to take the time of experts in the rehearsal of these matters in detail. We might none of us decline a commission to build the tower of Babel, if offered us and permitted by law. As in everything else, we must find equality and protection under judicious laws enacted to guard the interest of the many, and not to promote the vagaries of a few. And this leads to the presentation of a few suggestions concerning the needed changes in the Building Act. We must give early attention to these, for if we and others equally well-informed neglect the matter, the cranks will exert themselves actively, as they always do, and we shall have an amended law perhaps more faulty than the present.

It is probable, from the present drift of public and expert opinion, that some movement will be made:

1. To govern the height of buildings by the width of the streets on which they abut.

2. To restrict floor-areas of business buildings, perhaps to 5,000 feet.

3. To require all warehouse floors to be of mill-construction or protected with wire-lathing and plastering or an equivalent.

4. To limit the area of openings in street-fronts, and compel steel shutters to be put to shop-fronts and warehouse front windows.

5. To have all constructional ironwork, interior and exterior, protected.

6. To reduce the size of openings through party and partition walls and require self-closing fire-doors.

7. To require walls faced with stone ashlar to be thicker than if solid brickwork.

In addition to these, many minor changes are needed in the law to make it absolutely clear and to correct some mistakes and oversights of the present version.

On all these matters there will be much controversy. The real-estate owners, the insurance authorities, the fire experts, and last, but far from unimportant, the tenants, will have something to say. The architects and builders, if they wish to promote a good law that can be enforced, must act with great discretion, deliberation and conservatism, and must not allow their enthusiasm for the ideal to interfere with a sure step in the direction of better building.

[1] "Fell in ye year 1753 Nov. 18th early in ye Morning by a great Earthquake by my old Master above." — Original document found in the Faneuil Hall grasshopper (Vane). — Porter's "*Old Boston.*"

"There was an old crack in the front wall, said to have been caused by an earthquake in 1663, 'which made all New England tremble.'" — The "Ship Tavern." — *Ibid.*

"A wizened little two-story gambrel-roof house, built soon after the Great Fire of 1676. It is sadly wrinkled by age, scarred by hard usage, and disjointed by an earthquake of the last century." — House on North Street, opposite Sun Court. — *Ibid.*

BOOKS AND PAPERS.

IT may surprise the authors of this work[1] to know that as the writer regarded its shape and bulk, perceived the quality of its paper and the excellent form of its typographical make-up and examined its contents, these questions occurred to him: "In what is this book different from that object of many an architect's scorn, a 'trade catalogue,' and how can it rightly be entitled to a review in these columns when a similar treatment must be denied to the equally handsome, useful and bulky volume that is published with a view to persuading people to purchase the author's hardware? Is it more legitimate to hawk about designs for houses than designs for artistic hardware? Does an author come more within the literary fold when he dilates upon the cunning devices he creates on paper for builders to follow than when he describes the merits of ingenious appliances which builders may use?" Both books are made and distributed with a single purpose — the deriving of a future pecuniary return through the exploiting in this way of the goods the authors manufacture. Both, too, seek to disguise their real intent by adding certain instructive matter of general application, one by describing the kinds of metals, their properties and the methods of working them, together with tables of one kind or another which have a daily and general usefulness; the other's domino consists of essays in criticism, dissertations on taste and a variety of unsubstantial subterfuges. In one case the disguise is too insufficient to prevent one's perceiving the real character and meaning of the publication; in the other case it is too often a sufficient cloak. It is deemed by many architects unprofessional to advertise in the newspapers, to distribute circulars and cards, or to tout for work with the wire-pulling methods of the needy jobber; others do not disdain some or all of these methods, and there are even some we could name who do not shrink from placing on the circulars they distribute the designs of abler architects for whose names they substitute their own. How far the arts of book-making can be made to differentiate the act of those who seek work with the aid of the cheap circular distributed by the gutter-snipe from that of the men who seek it in book-form is a question for casuists to determine. Every man's first duty is to procure the means of sustaining life and he is not to be blamed if, one method failing, he employ another — always provided he overstep not the law.

In the case of this book the disguise, to still make use of the word, or the padding, if another word is preferred, consists in three or four essays of very singular substance to be found in a book of architectural character, since they have rather the rhetorical flavor with which young clergymen imbue their early discourses than the usually simple and straightforward style in which architects describe their intentions and explain their aspirations.

The authors write with much earnestness, but without a due observance of proportion in the use of capitals, for one finds that the words art, architect, architecture, building, home, etc., are treated in this respect with quite as much respect as the frequently occurring name of the deity and his appropriate personal pronouns. The first essay is devoted to maintaining the unrighteousness of the "sharp contrasts" that exist between the states of the several social classes of to-day, and the argument that, because the coal-heaver as he passes Trinity Church is not so uplifted by its architectural beauty as to be able to abstain from his evening dram and its several successors, therefore it is quite wrong that money should be spent for architectural work of such character. What would happen to the world if things were reduced to the comprehension of the coal-heaver the authors do not stop to inquire, but what a glorious time for cakes and ale there would be, if this reasoning should be applied! There are "sharp contrasts" and there always will be, if you go far enough in search of them, and they are painful and distressing to the sensitive mind when they are perceived, but in relative quantity they are gradually growing less, the world over, and the permanence of good institutions is only made the more lasting by the sloth of the evolutionary process. The unrighteousness of the distribution of wealth — and a stop is not made to consider the impossibility of maintaining an equal or an equitable distribution of wealth or how in the natural course of time the difference in mental fibre must inevitably lead to the collecting in comparatively few hands of an inequitable share of

[1] "*Examples of American Domestic Architecture.*" By John Calvin Stevens and Albert Winslow Cobb, Architects. New York: William T. Comstock, 1889.

the once evenly distributed wealth — is in some way an obvious evil, but it is a hopelessly incurable one and it is not really half so bad, unrighteous and miserable as enthusiasts would have it appear. The good that men of great means do with their money is unknown, generally, to all but the objects of their assistance. The gathering of great wealth in few hands makes possible a vast amount of work that promotes the general welfare, even that of the coal-heaver, in a way that an equitable distribution would render impossible for centuries, during which the advance of civilization and progress must halt along the way. It *is* hard for a man to work ten hours a day and receive only $1.50 on which he must support his family, but it is in a sense his own fault or rather the fault of his undeveloped intellect, which does not allow him to seek out and obtain a higher rate of payment. But he is only one step in the evolutionary process; his children, the chances are, will be more intelligent, will seek other kinds of work and will fare better, and before many generations will become the capitalists now so obnoxious to the sentimentalist.

It is curious to find the authors citing as an instance of the unrighteousness of the existing order of things the fact that, owing to the destruction of certain rookeries in Berlin and London for the sake of building improved houses on the same sites, the former population was turned out, and, pending the rebuilding, had to resort to such shelters as could be found, and, as is the custom with the proletariat, declined to move away from the immediate vicinity of their daily labor in search of greater convenience and more healthy surroundings, but preferred to undergo all the horrors of insanitary and immoral crowding in dark and unventilated cellars. Our authors look on these self-inflicted sufferings — in most cases not felt to be sufferings, very likely — as glaring instances of "sharp contrasts," and hold that the capitalist was responsible for them. In like manner, they probably look with sentimental disapproval on the radical changes now going on in Naples, which, given time, will probably transform that most pestilential of cities, which travellers pass through but rarely stop in, into a well-regulated and civilized place. But it is a question how far the capitalists and the great middle-class are to be sacrificed for the sake of constructing a world which is just adapted to the needs and desires of the *lazzarone* and the coal-heaver. If it is granted that the great middle-class has also a right to a degree of civilized comfort, and that its instincts are upwards to a higher plane of intellectual and material living, and not downward to mere animalism, it must be acknowledged that the enterprises that the capitalist undertakes serve their very useful purpose in giving not only immediate employment to the proletariat, who may feel the "sharp contrast" but, nevertheless, is exceedingly glad to get his daily wage, but also in furnishing to the aspiration of the middle-class a most useful object-lesson.

The object our authors have in taking their turn upon the socialistic hobby-horse which every one is riding nowadays — every one, at least, who is not writing essays, tales and novels based on psychical research — is that it may serve as an introduction to the proposition that the best building is the simplest, or the simplest the best. It seems to us, however, that one can hymn the charms of sweet simplicity without forbidding that mankind shall thrill with the more poignant emotions which more elaborate, but not less real, works of art stir in most beholders, who do not think that the heaving of coal is the most noble occupation of man.

One would suppose that where simplicity was the first care of the designer it would be most conspicuous in those designs where he had only his own feelings to consult, but, oddly enough, the designs our authors lay before us where simplicity is most obscured are those which are indicated to be "designs" and "sketches," so that it is evident that their eccentricities are not due to the whims of the exigent client, but are proofs of an ungodly hankering after the fleshpots of architectural enormities beyond the comprehension of those who suffer under sharp contrasts. "A House for an Acre Lot," which evidently was not designed for a definite client, and certainly is *not* a house for an acre lot, can hardly be held up as a sample of simplicity in design. But this one design and a few other less eccentric ones apart, our authors fairly practise what they preach, and show good, wholesome, simple designs for the dwellings of simple people, houses and cottages that look and doubtless are homelike and comfortable, that will give the passer-by a pleasing sensation as he goes, but will not excite keen envy, nor yet remind him of the inevitable existence of poverty and wealth. Men who do such work as this assuredly get more real pleasure in the doing than those who are called on to spend vastly greater sums, and have to resort to all sorts of tricks and experiments in order to spend the appropriation and accomplish a result that shall outshine the building of the client's best-detested neighbor.

Of the manner in which these sketches are presented we have no word of dispraise to say. Mr. Stevens, whose initials are affixed to most of these sketches, it may be remembered, was, a year or two ago, invited to make one of the sample drawings in our exhibition of architectural rendering [See the *American Architect* for July 23, 1887], because we considered him an excellent representative of one school of rendering, a school which appeals rather to the lay than to the architectural eye.

The book is a singular compound, but we do not say that it is the worse for being singular, though it is a compound few would have thought of mixing. It seems likely, however, that few who care for the book as a legitimate architectural undertaking will care for the arguments of the essayist, and yet the only thing that raises the work above the level of the trade catalogue is the presence of these same essays, hardly a paragraph of which can be read without exciting antagonistic feelings. To our minds, the authors' attitude is strained, unreal, untenable, unnecessary, exaggerated, and yet there is enough of truth in their position to make one willing to stop as he reads along for a moment or two while he reflects whether writer or reader is right or wrong in the matter. As usual, the effect on the reader is that he takes up a position as remote from the writer as possible; that is, in this case, as the writer has perched on the topmost pinnacle of spiritual exaltation, the reader plods amidst the most prosaic of mundane necessities. As usual, the proper position lies somewhere between.

Now and then a conclusion is put strongly and well, as, for example, this:

"As finery is to decent raiment, as gluttony is to eating for life's sake, as wantonness is to wedlock, so is this intemperate abuse of the principle of true art to true art itself. The one is ennobling, the other is degrading. And in a Christian church, of all places, care should be taken that all base travesty of art should be excluded."

No exception can be taken to this as a statement, but then what is "true art" and what is not? Our authors declare that an "eight-foot St. Paul" must be carefully avoided, that "sculptured oak leaves, grape-vines and acanthus capitals" are "rot," and "tell no good story." They dislike the "tattooing of the walls of a temple built in the Good Shepherd's name" while there is a myriad of sheep of the fold still wandering outside in suffering and despair. Yet, in spite of the disconsolate wanderings of these shepherdless sheep — our doctrine teaches that the shepherd most anxiously searches after the missing hundredth one, lamb or old wether — our authors allow themselves to use "cathedral glass of harmonious tones," carved "constructive features, such as trusses and columns," an "occasional memorial window," "frescoes at either side of the pulpit chancel," and are willing to do these things without stopping to think of the wrong they are doing to the outcast sheep by flaunting in their faces a sharp contrast between plain and cathedral glass, rough-sawn timber, and the same hand-carved, plain plaster and decorated. It is Tweedledum or it is Tweedledee. Which? What is "true art" and what is not?

THE next publication[1] (published for private circulation only) before us does not plunge the reviewer into the unfathomable depths of moral, social and "true art" ethics. It bids him consider such concrete facts as that a business block built after the designs of the author at a cost of $47,000 rents for over $30,000 annually, while three houses in the suburbs of New York which cost less than $11,000, rent for over $2,400 per year.

In make-up, costliness and size this little unbound pamphlet is as different as possible from the costly and elaborate book we have just been considering, but the intentions of the authors are absolutely identical, and one is as genuine an addition to the literature of architecture as the other. But in the second case no attempt is made to disguise the fact that the publication is intended to promote the business interests of the author, since most of the designs are accompanied with extracts from newspaper accounts of the several buildings shown, which, apparently, prove that the author has been unusually successful in accomplishing satisfactory results in widely different fields of architectural design. On turning over the pages, one finds that in almost every case the designer has had "an idea," not always a good one, of course, but yet not always a bad one. The collection forms an admirable foil to the works of Messrs. Stevens and Cobb, for while these have avowedly sought simplicity before all things, we should judge that in most cases simplicity was almost the last element in designing that had engaged Mr. Gilbert's attention.

THE list of serial publications which devote themselves to the interests of architecture and building, already formidable because of its length, must this week be increased by the addition of three new names. The first, the *Canadian Contract Record*, is a weekly issue of four small quarto-pages, without illustrations, which aims to give early information concerning building proposals and contracts, and is issued as a supplement to the *Canadian Architect and Builder*.

The second is the *Architects', Builders' and Hardware Journal*, a monthly periodical which is to be published at Atlanta, Ga. The initial number contains three photo-lithographic illustrations of the standard size, and ten pages of text, which, aside from half a page of short notes and one contributed letter, are filled with articles borrowed from other journals.

The third new-comer is to be a semi-monthly paper published at Pittsburgh, Pa., under the name of the *Journal of Building*, and in make-up forms a decided contrast with the last, for it announces *twenty* separate and individual departments, and to give adequate attention to twenty departments within the limits of twelve pages surely calls for the exercise of great skill in condensation, at least. Naturally, then, the publishers have secured "a corps of practical and experienced editors," and, as nothing is so disastrous as unorganized independent effort, this corps is "presided over by an editor-in-chief with ten years' experience in conducting builders'

[1] "*Architectural Sketches*," with illustrations by Messrs. H. P. Kirby, C. A. Vanderhoff, E. J. Meeker, Gray Parker and others, from original designs by Bradford L. Gilbert, architect. New York. 1890.

journals" — not one, but an infinite number apparently. This gentleman, of large experience, has achieved a position which, if we may believe the words before us, has been attained by no other man connected with the publication of building journals, for it is here said that he presides over the only journal "*that has an editor at all.*" This being the fact, it is our duty to seek how we may profit by the great experience of the only editor in the country, and, turning to the pages before us for enlightenment in the proper use of grammar, orthography, diction and rhetoric, we find that in the first line the new publication is called "an new organ," which seems to show that the real editor does not necessarily observe the rules which others have formulated as to the uses of "a" and "an" — but perhaps it is not an editor's duty to see that his publisher's announcements are properly worded and spelled. So we will turn over to the editorial page in search of samples of pure editorial English and good style, and here we find these gems: "I surmised a moment or two, and then resolved that my friend was more of a daplomat than many of the rest of us"; "and which, I am glad to say, that many hundred of my readers, after reading it, have patted me on the back"; "Nature has no rope on the top of her cubbord"; "but it is a duty I owe and you owe to the perpetuation of our land whose fathers planted as the bulwark, the flag of Liberty. That stone shall ever be its rock of all ages so far as I am concerned." This metaphorical outpouring makes us surmise that the person who prepared the publisher's announcement, where we find that civilization is in the habit of planting the "fig-tree of progress," was, after all, the only editor in the country.

SOCIETIES

THE DETROIT ARCHITECTURAL SKETCH-CLUB.

At the last regular meeting of the Detroit Architectural Sketch-Club, the following officers were elected for the ensuing term: *President*, J. A. Hackett; *Vice-President*, W. B. Stratton, re-elected; *Secretary*, C. A. Fullerton, re-elected; *Treasurer*, H. C. Stevens; *Executive Council*, A. Kahn, Max Grylls, George Harvey.

The next competition will be for a "city front."

The club has started a movement to organize the several Art Societies in our city into an association: the result from such a union is obvious, large and permanent quarters, a large library of art journals, etc.

Clarence A. Fullerton, *Secretary.*

THE ARCHITECTURAL LEAGUE OF NEW YORK.

The Architectural League of New York, respectfully announces that the date of opening of the Fifth Annual Exhibition at the Fifth Avenue Art Galleries, is unavoidably postponed till December 27. Press view and reception on December 26.

The Exhibition will remain open as heretofore stated until January 11.

Charles I. Berg, *Secretary.*

BOSTON SOCIETY OF ARCHITECTS.

At a regular meeting of the Boston Society of Architects, held on December 6, Mr. John A. Fox read the accompanying paper, and a general discussion followed upon the lessons of the recent fire, and the best methods of preventing the spread of fire from building to building; and a committee was appointed to present at an early day a proposition for revising the Building Laws of the City of Boston, in so far as they relate to protection against fire.

Arthur G. Everett, *Secretary.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

BARYE'S ENGLISH ADMIRER.

Boston, Mass., December 9, 1889.

To the Editors of the American Architect:

Dear Sirs, — In several recently published notices of the New York exhibition of Barye's works, I find the following: "Had he been born in Great Britain," said an English artist, "we would have had a group by Barye in every square in London." Imagine all the squares of the great metropolis looking like sections of a petrified zoological garden! May I express the hope that no other writer will quote this remark, which shows a praiseworthy enthusiasm for Barye's genius, but is as far as possible from the truth, judging by experience. I should like to know the name of this English artist, and to ask him how it is then that Alfred Stevens, an artist not inferior to Barye, was so poorly appreciated in England during his lifetime. Stevens was born in Great Britain, but it helped him little, and so greatly inferior a sculptor as the Italo-Frenchman, Marochetti, received numbers of commissions, while Stevens was neglected. To-day, nearly fifteen years after his death, his grand monument to Wellington, in St. Paul's, remains uncompleted by the addition of the equestrian figure of the Duke upon its summit, mainly because of the protests of the Dean against admitting an equestrian group into the sacred edifice. Yet there were already two such in the cathedral, Baily's monument to General Ponsonby, and Westmacott's monument to General Abercromby.

Even now, the sculptor in England who receives the best public commissions is an Austrian, Sir J. E. Boehm, a man, however, of much more talent than Marochetti. It is not inappropriate, perhaps, here to recall the fact that in 1886 the Royal Academy rejected a piece of sculpture by Rodin.

As for myself, I believe in the recognition and patronage of genius, no matter where it originates, yet good artists should certainly find support at home, which in England and America, not to mention other countries, they certainly often do not.

I see that in a late number of *Harper's Weekly*, so able a writer as Mr. Charles de Kay, quotes this English tribute to Barye. Mr. de Kay, who has written the text for the *de luxe* Barye catalogue and is Secretary of the Barye Monument Association, is in error when he says (in *Harper's Weekly*) that in Baltimore are only two of the four Barye groups from the Louvre. As a fact, all are there.

Anglo-American.

APARTMENT-HOUSES.

Philadelphia, Pa., November 26, 1889.

To the Editors of the American Architect: —

Dear Sirs, — We desire to obtain all the information we can, relative to the erection of apartment-houses, flats, etc. Could you recommend to us any publication, which would give us a variety of plans, estimates, etc., or suggest any other method by which we could obtain the desired information? An early reply will greatly oblige.

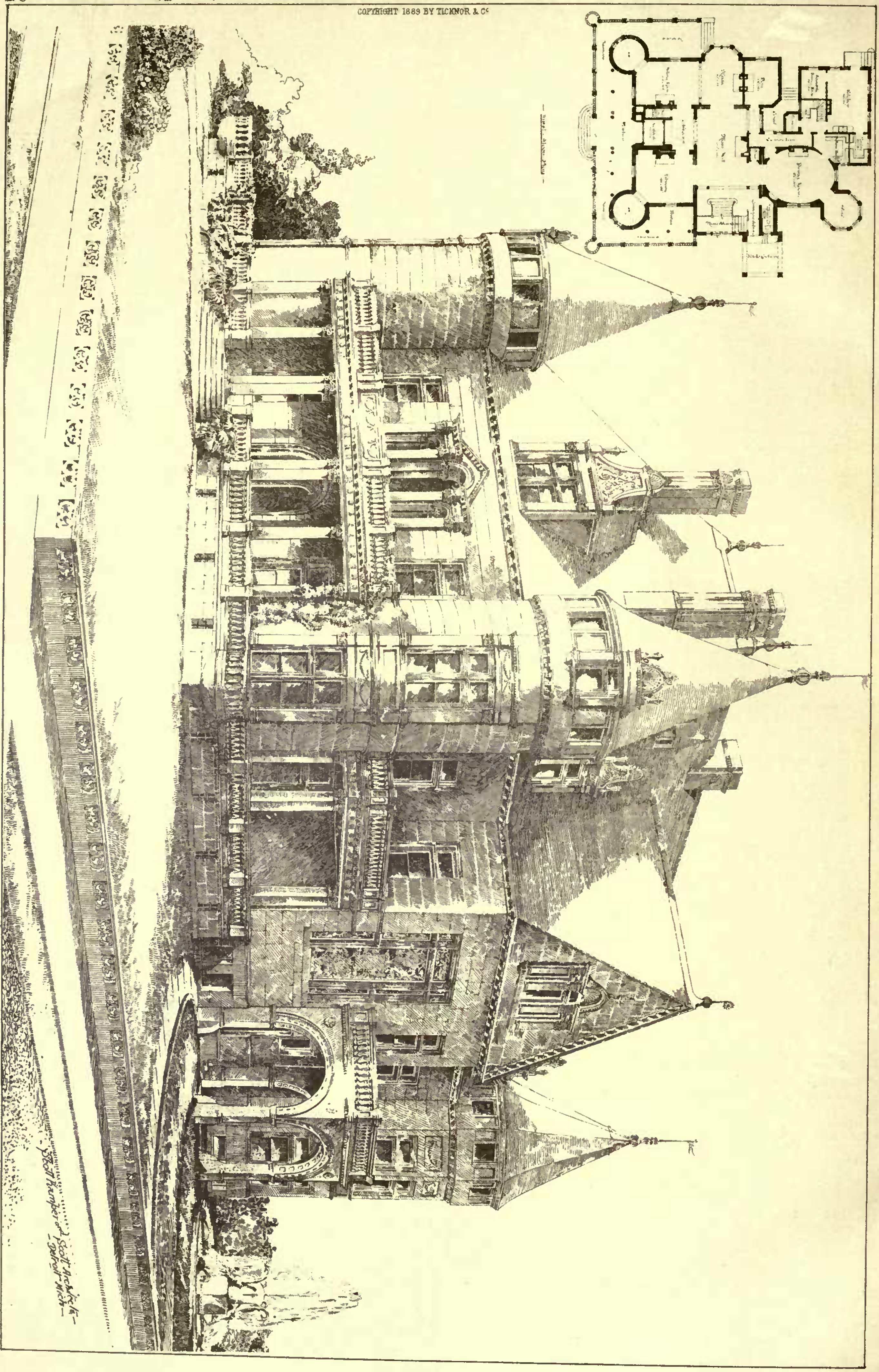
Very truly yours, F. A. Davis.

[One or two of the volumes of Daly's *Architecture Privée*, would give more plans of the sort than can be found together in any book we know of, but by far the best way to get a view of the modern planning of such buildings is to look through files of the technical periodicals. We have published many such plans, and some others can be found in the files of the *Engineering and Building Record*, while innumerable French plans, perhaps the best and most ingenious of all, are to be found in *La Semaine des Constructeurs* and *La Construction Moderne*, and German ones, which have their merits, as well as their peculiarities, in the *Deutsche Bauzeitung* and the *Wiener Bauindustriezeitung*. Detailed statements of cost are usually given in the French journals, but nowhere else. We have ourselves collected a good deal of material of the sort. If it would please our readers to have it reproduced in a connected form, we should be glad to know it. — Eds. American Architect.]

NOTES AND CLIPPINGS

Rome as a Seaport. — The Rome correspondent of the London *Standard*, in a letter on the subject of making Rome a seaport, recalls that this project and others of present times were originally proposed by Garibaldi: "When Garibaldi came to Rome to take his seat in the Chamber, the dreams which he had nourished as a boy, of aiding the material as well as the moral regeneration of the Eternal City, took form in three grand projects, each of which was considered at the time scarcely likely to be carried out, if, indeed, attempted, within the present century. They were, first, the embankment of the Tiber, with a view to averting the ruinous inundations to which Rome has been liable for centuries; secondly, the cultivation of the Roman Campagna, and, thirdly, the conversion of Rome into a seaport. The embankment, a huge and costly work, is already well begun, and the looker-down from the heights of San Pietro, in Montorio, or the Villa Corsini, may see considerable patches of the white marble wall as his eye follows the winding course of the river through the city, especially near the spot once covered by the picturesque squalor of the Ghetto (now swept away), and where its courses is spanned by a new stone bridge bearing Garibaldi's own name. The cultivation of the Campagna goes on more slowly, so many conflicting interests being concerned, and the largest landowners not holding exactly the most disinterested and patriotic views on the subject. But the greatest scheme of all — that which at the time appeared the most visionary — that of making Rome a seaport, is under the serious consideration of the authorities, and appears likely to be undertaken at no distant date. A commission has been formed to examine the projects which have been presented, consisting of the Prefect of Rome and a Municipal Councillor, an officer of rank in the navy and one in the army, and one representing the Ministry of War, the Captain of the Port of Civita Vecchia, and a prominent steamship owner. The project under consideration is approved by M. Lesseps. It is extremely simple. It is proposed to cut a canal eighty metres wide and ten metres deep from the Tiber, near the Church of St. Paul, outside the walls, to the seashore at Castel Fusano, a distance of eighteen kilometers, or eleven miles and a quarter. An American company would assume the construction of the works, and the estimated expenses is 68,000,000*f.* The enormous impetus which would be given to industry and commerce in the capital and in the whole province if this scheme can be carried out can hardly be overestimated, and its transforming effect upon the Italian capital must be all in the direction of prosperity."

S. J. Parkhill & Co., Printers, Boston.



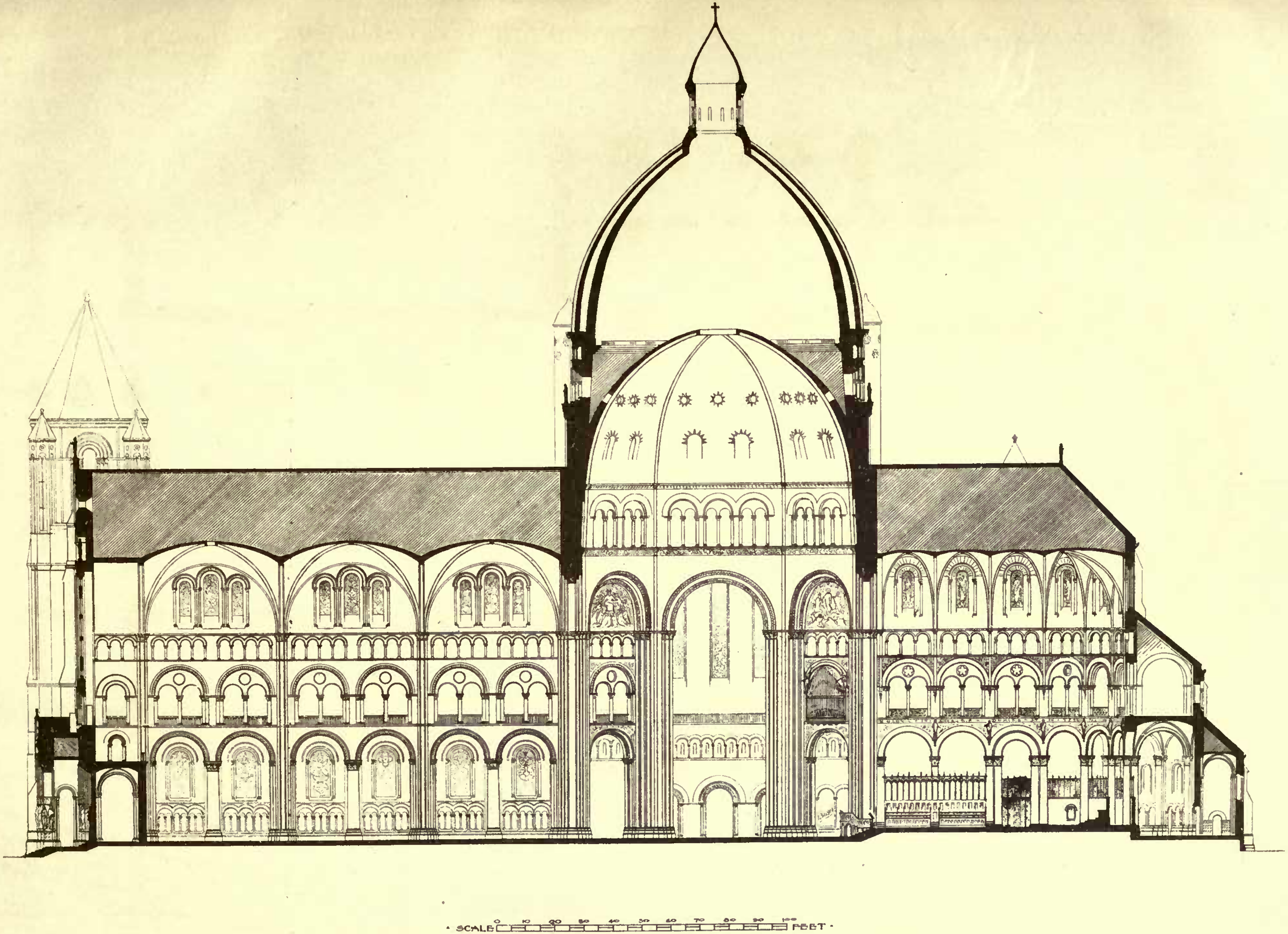
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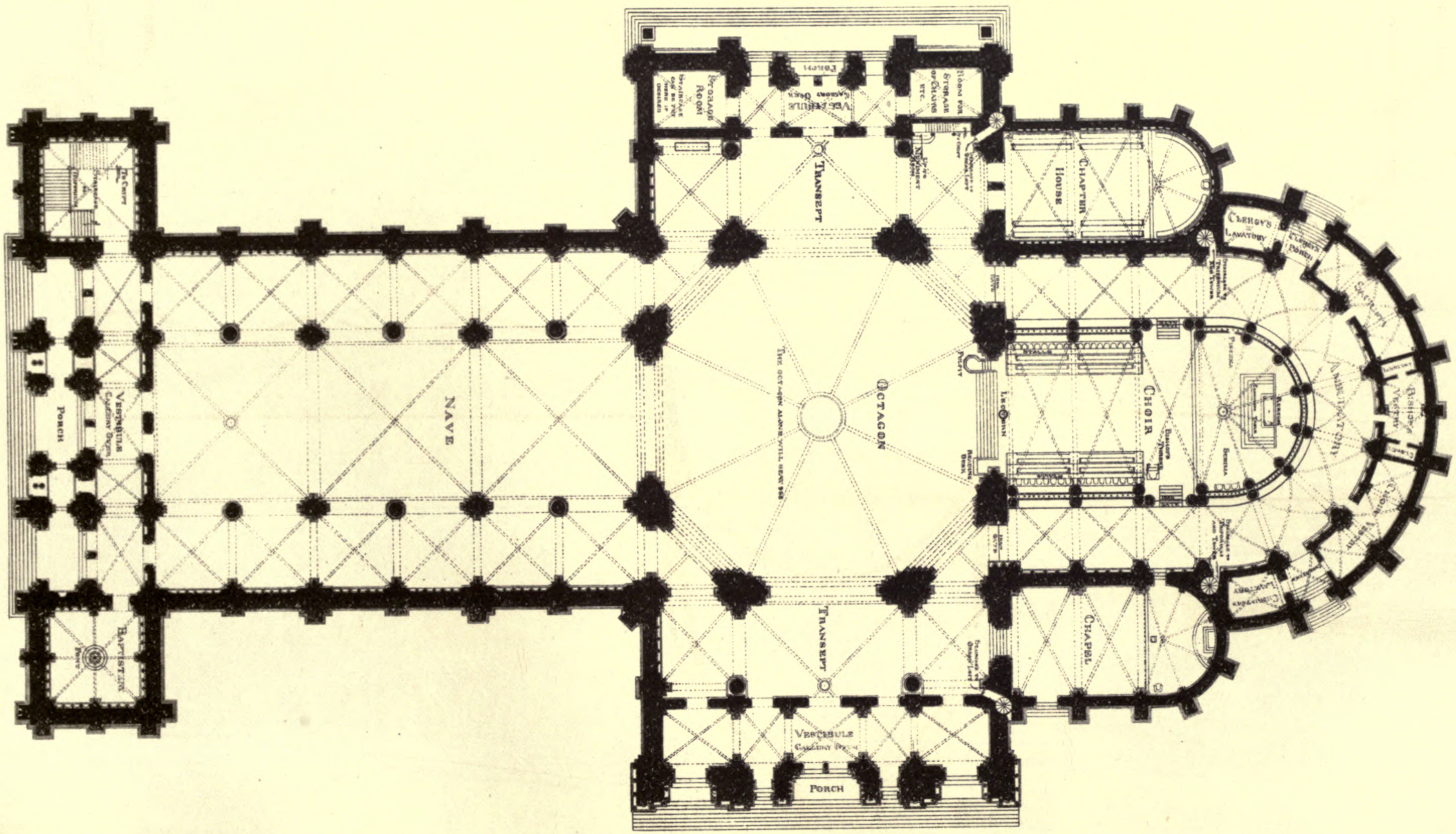


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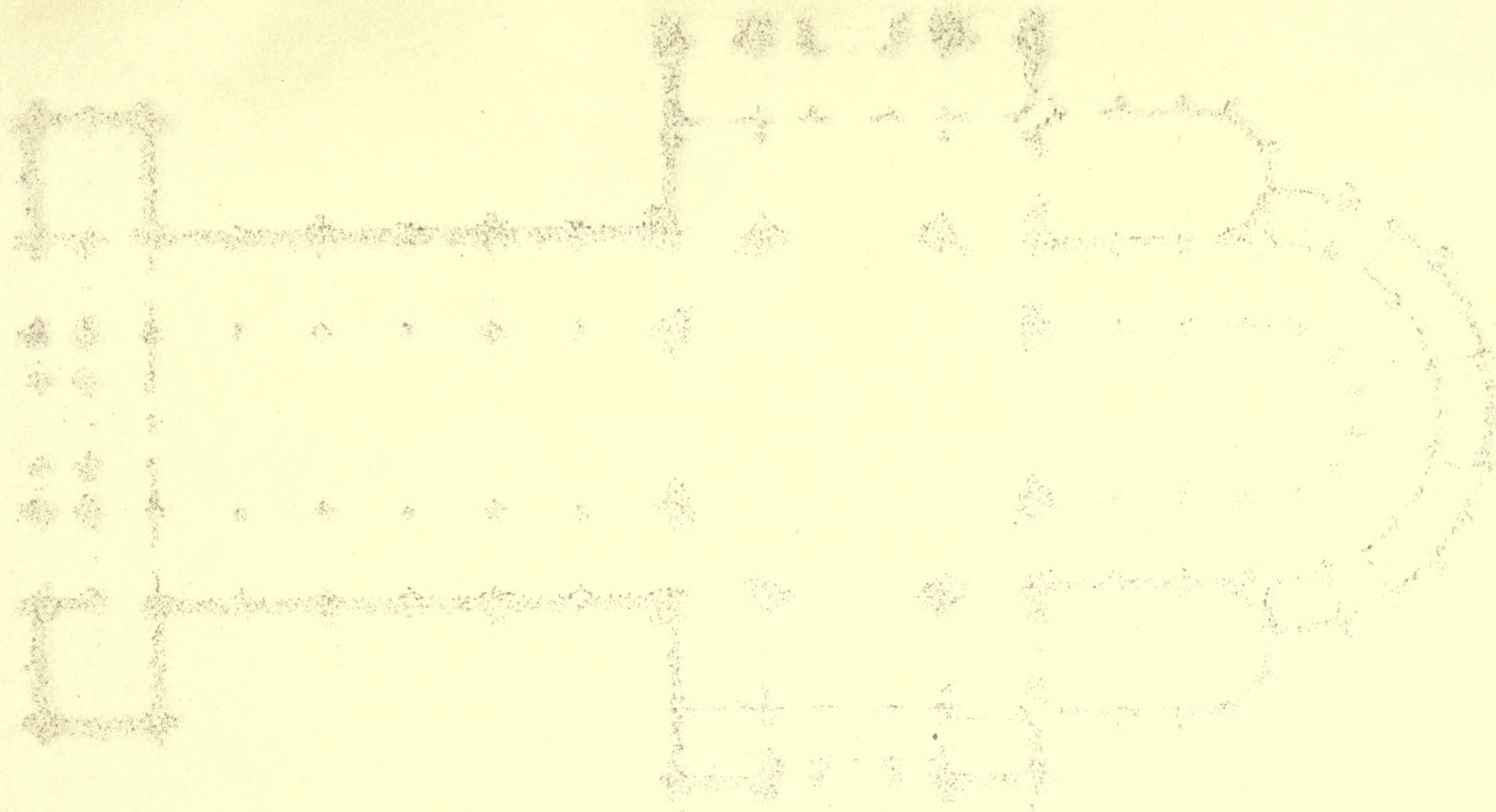


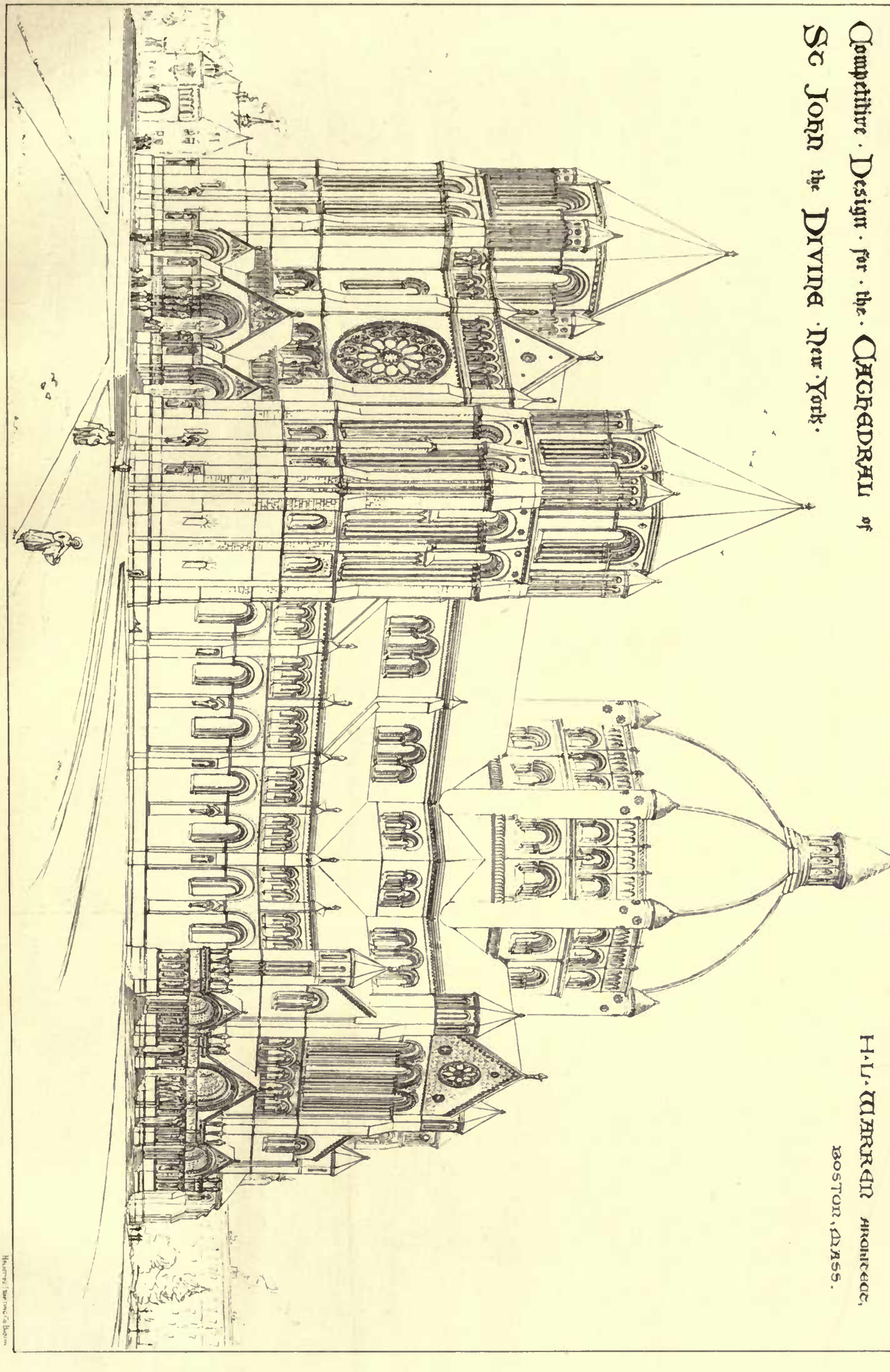
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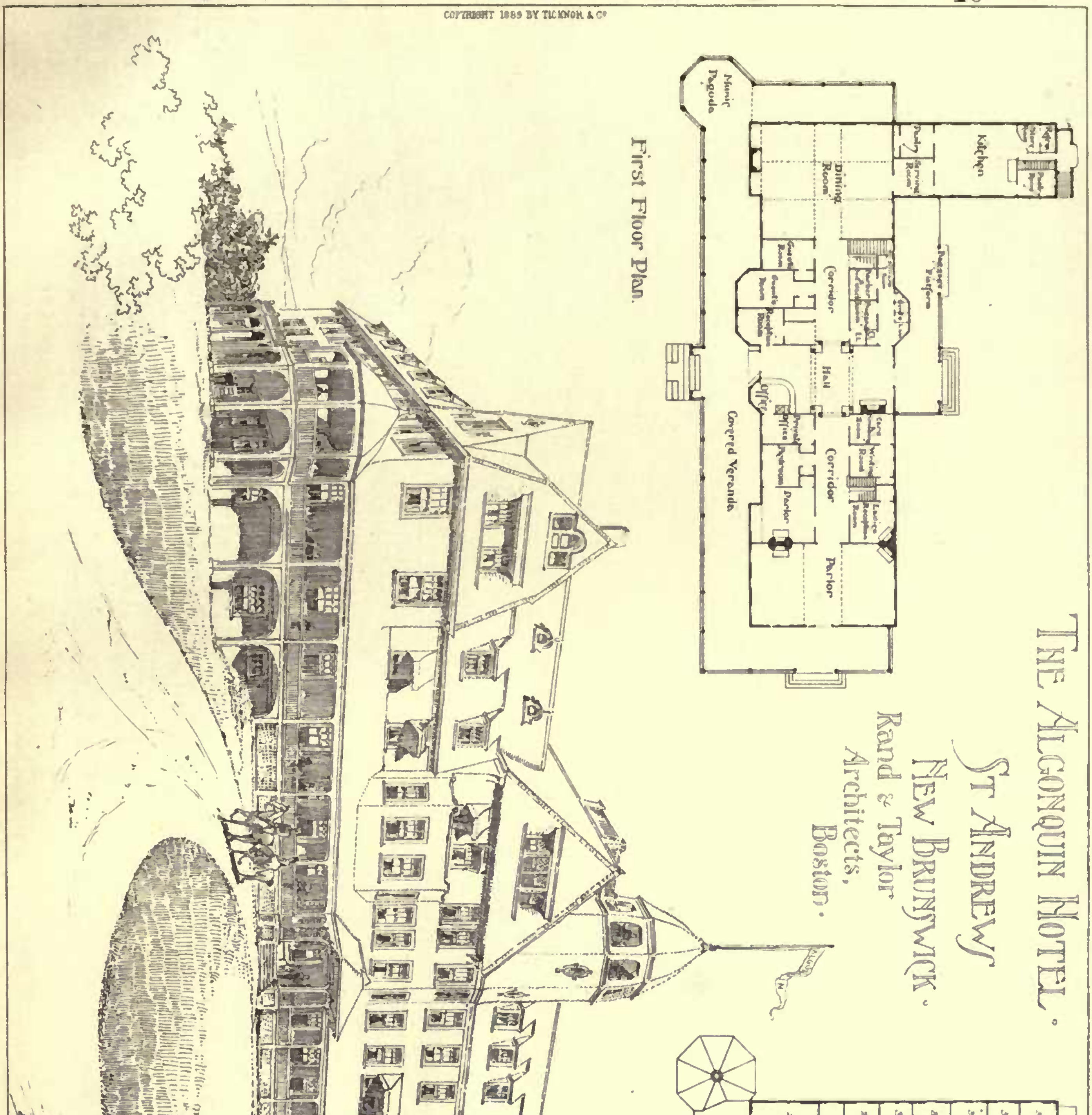


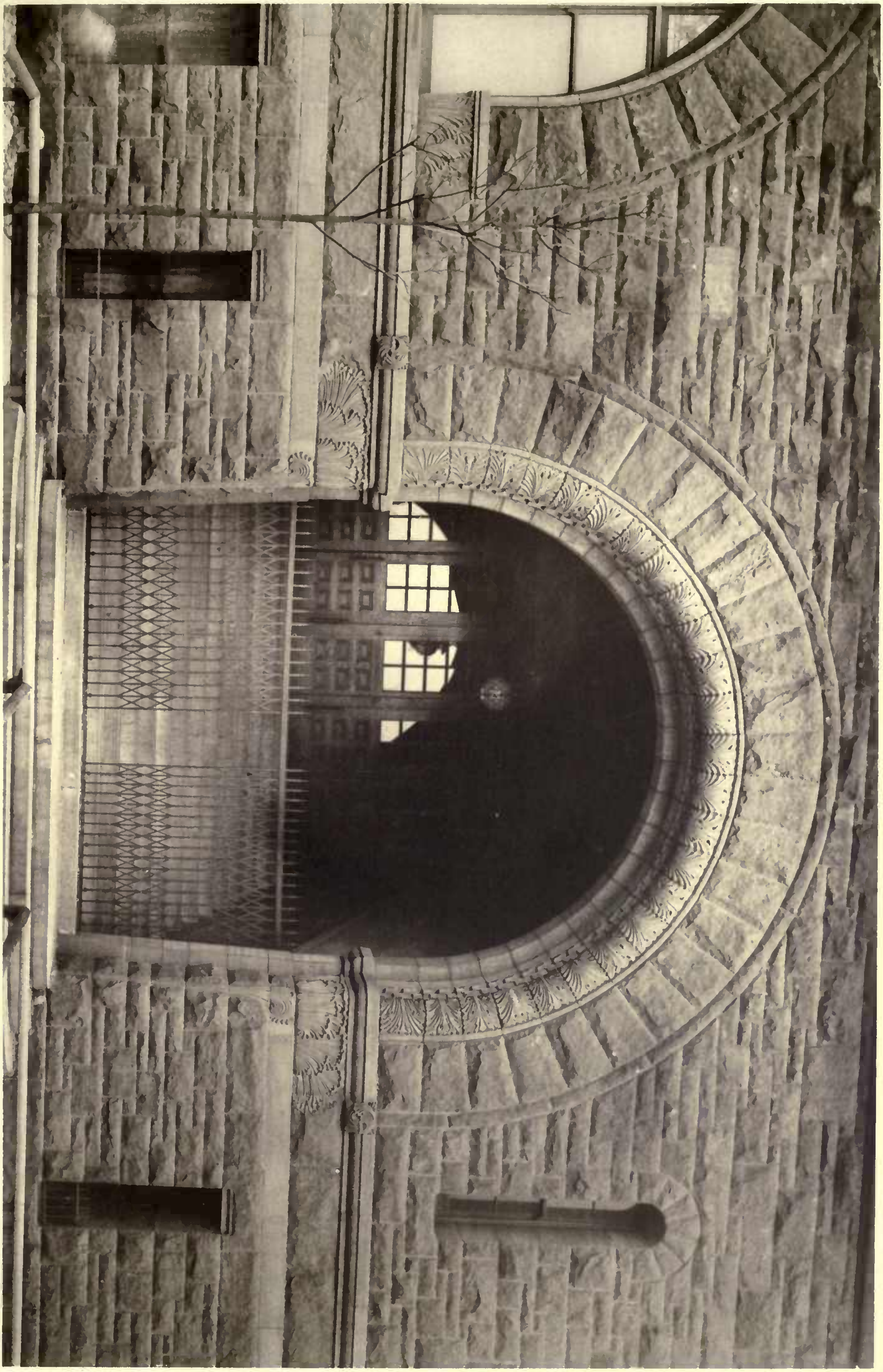
Competitive · Design · for · the · CATHEDRAL of St JOHN the DIVINE · New · York ·

H · L · WARREN Architect, BOSTON, MASS.




Competitive · Design · for · the · Cathedral · of
St John the Divine · New York ·
H · L · Warren Architect,
Boston, Mass.

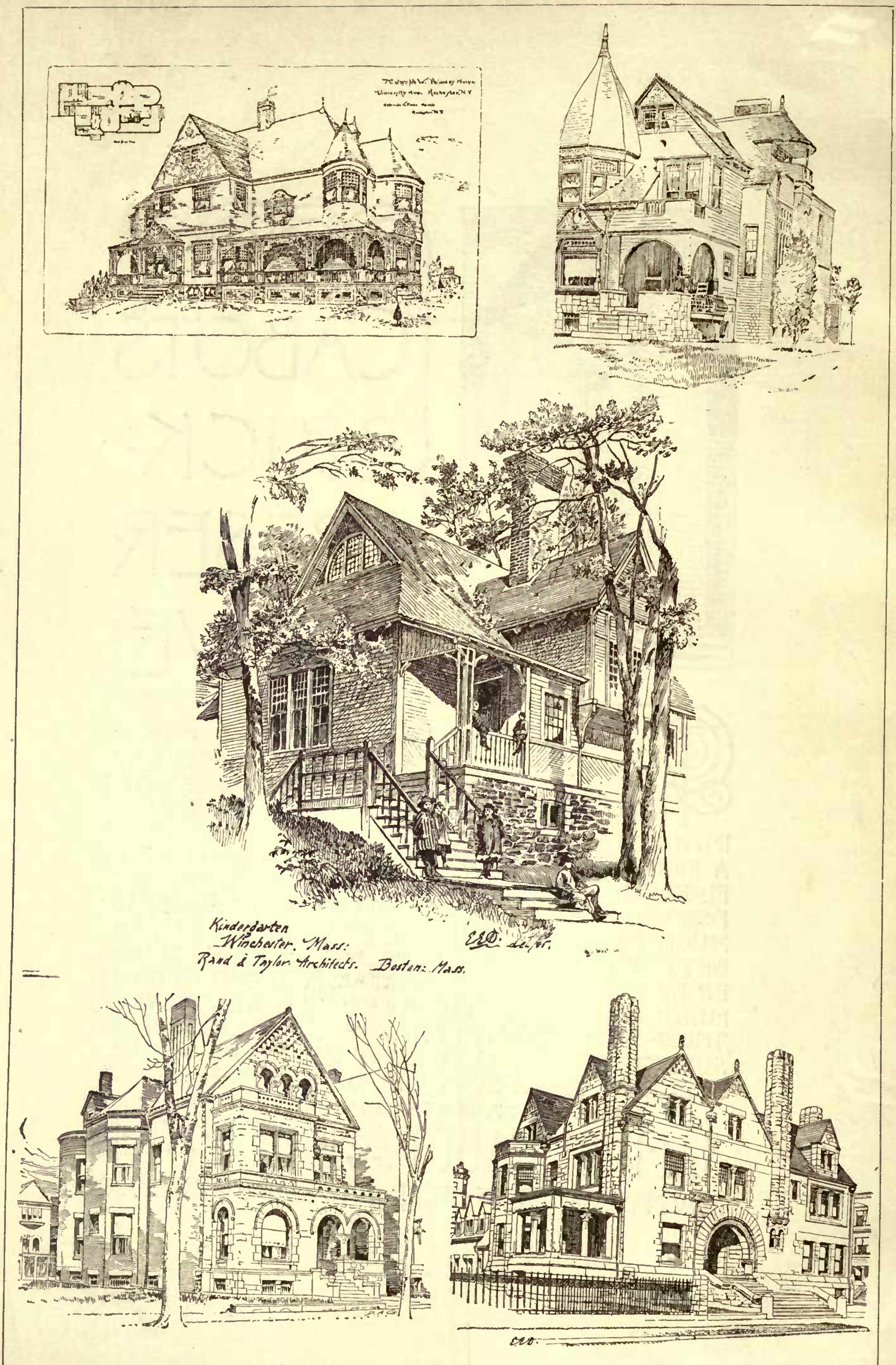

The Algonquin Hotel.
St Andrews
New Brunswick.
Rand & Taylor
Architects,
Boston.
First Floor Plan.
Second Floor Plan.
Music Pagoda
Kitchen
Dining Room
Corridor
Hall
Office
Covered Veranda
Parlor
Veranda
Roof



ENTRANCE TO THE WESTERN RESERVE MEDICAL COLLEGE, CLEVELAND, O.

COBURN & BARNUM, Architects

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AMERICAN HOUSES.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXVI. No. 730.

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ONE consideration is suggested by the Boston fire of November 28, which it may not be too late to mention. In addition to the thirty or forty engines present, belonging to the Boston Fire-Department, there were about as many more in action, which came from neighboring towns and villages. Of course, it was very noble in the officials of these towns and villages to send assistance to suffering Boston, but one cannot help wondering what would have happened if a serious fire had broken out in one of these towns or villages, while its extinguishing machinery, or a part of it, was absent on its mission of mercy. Few suburban towns possess more than two or three steam fire-engines, and these have generally a large territory to protect. If one is sent away, the district to which it belongs is placed at a great disadvantage, since aid, in case of a conflagration, must be brought from a considerable distance. It is hardly necessary to say that the insurance companies keep a close watch of the fire-extinguishing appliances maintained by each town, and fix their rates of premium accordingly; and we have been told that, however the underwriters' might admire in the abstract the fraternal heroism of Boston's neighbors, they would in practice refuse to pay the insurance money for losses incurred through the absence of the regular fire-extinguishing apparatus from its proper station. As this is a very serious consideration for suburban property-owners, it is singular that some one should not have called attention to it before. Of course, the insurance companies do not care to say anything about it until the occasion arises, for the simple reason that, under this view of the case, the transfer of the engines is very much for their benefit, saving them money in one place while it relieves them of liability in another; but the owners of houses in Brookline, Newton, Cambridge, Somerville and Waltham would do well, before another great fire occurs in Boston, to ascertain definitely what are the risks they run by having the local engines temporarily absent, and place such restrictions upon the amiable enthusiasm of their fire-department officials as may seem suitable to the circumstances.

THERE is an observation which has probably occurred to all architects familiar with city building, but which is not so obvious to the average purchaser or tenant, that houses built in blocks, all at the same time, and of the same pattern, are more likely to have concealed defects of construction and drainage than houses built singly. No doubt, a man who builds six or eight houses at once from the same plans can save something by the wholesale contracts which he is enabled to make for labor and materials, but the extent of his operations tempts him to make further savings, by using defective materials or improper methods of doing work, which would not, in a single house, be worth making at the risk of losing a purchaser or tenant, but which, when multiplied by six, or eight, or ten, amount to a considerable sum. Of course, there are well-built blocks and badly-built single houses, but we venture to say that the refuse lengths of drain-pipe, the clay-joints, the job-lots of imperfect soil-pipe, bought for a trifle at the foundry, the damaged lime, the split gas-pipes, the second-quality hardware and the botched workmanship are to be traced much more frequently to the blocks than to the single houses. Another guide to the inexperienced purchaser is to be found in the artistic appearance of the house which he looks at. It is often said that a commonplace-looking house is the safest to buy, because, if the purchaser has to sell it again, no one can object to its appearance, while any departure from the ordinary type, although it might please some persons, would offend others. We have our doubts as to the æsthetic wisdom of this maxim, but as a practical guide it is still more objectionable. In these days, a well-studied front implies that an architect has been concerned with the building which it adorns, and, in spite of all the disparaging remarks made about architects, very many of which, by the way, are set afloat, with interested motives, by the speculating builders, the fact cannot be questioned that houses constructed under the supervision of real architects are, independent of their artistic interest, generally far better built, better planned, better drained, better plumbed, better heated, better ventilated and better lighted than those erected and sold by builders. They often, but by no means always, cost more per square foot of ground covered than builders' houses, but they usually cost less for the same accommodation, since any architect worthy of the name can plan more and better rooms in the same space than an unskilled builder's clerk; and, contrary to the common idea, they generally contain, for the same money, more and better materials and workmanship than the builders' houses. The reason of this is that architects are ordinarily employed by responsible owners, who pay their bills in cash as the architect certifies them, and mechanics and dealers in materials are glad to offer their most favorable terms to a customer who can be relied upon not to fail suddenly, with assets amounting to one per cent of his liabilities. Moreover, the speculating builder, who piles up mortgages on his houses, is obliged to pay enormous rates of interest, which he must save somehow out of the cost of building, and his men, even if they are capable of good work, are more likely to take pattern by him, and give the smallest value for the most money, than to try, as all decent workmen do under the supervision of an architect, to attract attention by their skill. The architect's five per cent is, it is true, to be added to the cost of the buildings which he designs, but this would usually be covered by the difference between the interest which a responsible owner and a speculating builder would have to pay on the investment, leaving the improved planning and construction, and the extra discounts for cash on all the contracts for work and materials, as additions to the value of the building which cost the owner or purchaser nothing.

ANOTHER ingenious builder has been caught in New York, by the inspectors of the Board of Health, who are remarkably successful in detecting frauds upon the sanitary regulations of the city. The builder in question constructed a row of houses, and, under his contract, was obliged to connect their drains with the sewer. The cellars were excavated in rock, and to run the drain-pipes out to the street would have involved blasting out more rock, at an expense of three hundred dollars for each house. It is needless to say that a prudent speculating builder will do a good deal of thinking before he will spend three hundred dollars on anything that will not show when it is done, and it soon occurred to our hero that he could run the drains back, through the cellar, and into the yard, where there would be no rock to excavate, and where the ends of the pipes could discharge into a lot of loose stone, which formed the foundation of the fence-wall between his property and that of his neighbors. So long as no drainage went through the pipes, this sort of outfall would be just as good as any; and after the houses were sold, and the money paid, the new proprietor might have the arrangement changed, if he did not like it. The houses were sold, in this condition, and in course of time mysterious illnesses began to occur in them. The Board of Health inspectors were called in, and soon found the cause of the trouble, but we are not informed whether the builder was brought to justice. Of course he ought to be, for the protection of the public in future, but, in practice, it is difficult to obtain convictions, even in worse cases than this.

We have seen a house in New York, on a prominent corner on upper Broadway, where the soil-pipe ended just under the first story floor. The occupants of the building did not use the cellar, and the workmen who came to remodel it inspected the foundation walls and piers from a raft of planks.

THE scheme for the erection of a monument in Philadelphia, at the expense of the General Government, to commemorate the first century of the existence of the United States, which has been in the hands of the Governors of various States, has advanced another stage. Last July, the Governors of the thirteen original States met in Philadelphia, but decided to invite the coöperation of those of all the present States, and to adjourn until winter. A few days ago the adjourned meeting took place in Washington, and a bill was adopted, for presentation to Congress, providing that one citizen from each State and Territory, to be nominated by the respective Governors, and thirteen citizens of Philadelphia, shall constitute a commission, with full power to erect a suitable monument, with the sum that Congress may appropriate.

ONE of the most striking electric-wire accidents yet described occurred in Cambridge, Mass., a few days ago. A stray telephone wire, which had been long disused, dropped from its support at one end, and fell across the street. Mr. Eveleth, the Superintendent of the College buildings, with some of his men, attempted to cut the wire away, but it came in contact with the overhead wire of the electric railway which runs through the street, and, hanging thence to the ground, exhibited a series of electrical phenomena. According to the newspaper accounts, which generally need to be taken with a grain of scientific salt, the current which escaped from the hanging wire as it swayed back and forth, "tore up the street, and melted the railroad tracks at different points." Meanwhile, Mr. Eveleth continued his efforts to catch the wire with ropes, and remove it, but before he succeeded in doing so, it came in contact with other telephone wires, causing the burning-out of several telephones in the neighborhood, and, in one of its swings, touched a horse which was being driven past, killing him instantly, and stunning his driver. Fortunately, no further damage occurred, either to the public or the courageous volunteers who were at work on the wire, and it was finally detached, and put where it could do no more mischief.

A VERY interesting case, which contains several points of great importance, is submitted to M. Collet-Corbinière by a correspondent of *La Semaine des Constructeurs.* An architect was commissioned to build a school-house, with town-hall connected, as is often the case in France, on a piece of ground bordered by a brook. The mayor informed the architect that the brook, even during a flood, never overflowed the site of the building, and the architect arranged for a cellar under a part of the structure, with a window in it. After operations were begun, the mayor began to be afraid that there might be an overflow, and directed that the cellar should not be excavated; so the floors were laid without one, the timbers being from two to four and one-half feet above the natural surface. Before the foundation walls were done, the architect, on one of his visits of inspection, was shown by the mason, in presence of the contractor, that the window, in the place where it was planned, would be covered by the outside steps, and he gave a verbal order to the contractor to make openings in the walls on the other side of the building, to give air under the floors, instead of building the window. The contractor either forgot all about the matter, or, with a malice which is altogether too common among contractors, purposely disobeyed the order, in the hope of getting the architect into trouble; and the ventilators were not built; and the architect did not subsequently notice the omission. Four years afterward the floors were found to be settling, and the architect, on examining them with the contractor, found that the beams were badly rotted, those which were farthest away from the ground and from the brook having, curiously enough, suffered more than those nearer the surface, and, presumably, over moister ground. The architect, finding that the trouble had evidently proceeded from lack of ventilation, through the omission of his ventilators, offered to pay half the cost of a new floor, proposing that the contractor should pay the other half; but the contractor absolutely refused to pay any part, and produced a plan, made by the architect's clerk, in which the foundations were shown without any opening. Thereupon the town commenced suit against the architect and contractor jointly to compel them to replace the floor, and the question was referred for advice to *La Semaine.*

M. COLLET-CORBINIÈRE gives the architect, we are happy to say, a great deal of comfort. In his opinion, to speak briefly, the architect is not liable for any part whatever of the damage, and he quotes from M. Frémy-Ligneville's manual the rules of law which lead him to this conclusion. In the first place, it is well established in France that an error of construction, in order to involve the architect in liability, must be proved to have proceeded from following his plans and specifications, or from obeying his orders. In cases where he has given no orders, or where the plans and specifications are silent, the whole responsibility for proper construction rests upon the builder, who is expected, just as much as the architect, to know the rules of the art which he practises. It is true that in the present case the builder professes to have a foundation-plan with no openings shown, but the architect is not irrevocably bound by a plan delivered to a contractor. He is perfectly free to modify it, as the work goes on, in such a manner as the circumstances may seem to demand, and the plan thus modified becomes the direction which the contractor is required to follow. Nor is it necessary in France that such orders for modifications should be in writing, even though they may rescind or change portions of the plans and specifications. The contractor is at liberty to defend himself from responsibility by pleading the verbal orders of the architect, and, in the same way, the architect is entitled to prove that he gave verbal orders correcting mistakes in his plans or specifications, and, if he can do so, his plans and specifications so corrected stand as those for which he is responsible, and the builder disregards or disobeys them at his own sole peril.

SOME of our tourists will be glad to learn that the Swiss people, like their summer visitors, are not all pleased with the abolition of the diligence, and the substitution of the railway train. Not long ago, a new railroad was opened between Langenthal, on the Bâle-Berne road, and Huttwyl, which had previously been accommodated by a stage from Langenthal. The surrounding country is pleasant, but not remarkable for fine scenery, such as could be better enjoyed from a diligence than a railway car, yet the people along the road were so sorry to lose the old stage that on its last trip, the day that the trains began running, the driver and his horses were arrayed in deep mourning, and were received with funeral music. Unless this particular route was more free from dust than most of the diligence roads in the Swiss lowlands, the grief of the natives at the discontinuance of stage travel would not meet with unmixed sympathy from foreigners, but every pleasure traveller must be sorry to think that the Brunig diligence route, perhaps the most varied in Switzerland, has been abandoned, and when the Simplon post-road gives way to a ten-mile tunnel, it will be time for the lovers of the picturesque to unite in the defence of Nature against engineering.

A LITTLE exploration has recently been made at Lower Ingelheim, on the Rhine, now a village of two or three thousand inhabitants, but eleven hundred years ago, the site of Charlemagne's favorite palace, where gathered the most intellectual company in Europe, and where, later, his miserable descendants came to die. The ruins of the palace itself fell down about fifty years ago, but careful investigation has now shown that the walls of the basilica originally attached to the palace are still standing, and form a part of the exterior walls of a cluster of houses, which are still inhabited. Although a royal basilica of the eighth century is an object of the highest architectural and archæological interest, the occupants of the houses around it refuse to allow themselves to be disturbed, and the generous amateur who supplied funds for the work has been obliged to content himself with obtaining an agreement from the lord of the manor that no further alteration shall be made in the walls, and with laying out neatly the only accessible approach to the ruins, to which he has also caused a tablet to be affixed. The court-yard of the palace, the scene of so many romantic adventures, appears to be now occupied by a Jewish cemetery, which cannot be interfered with, but the Hebrew congregation has very courteously agreed, without compensation, to keep the ground in good order, and to give the State the first right to purchase it, if a sale should ever be made.

IS MEXICO'S GREATEST PAINTING A TITIAN?

THE TITIAN ENTOMBMENT AT TCZINTCZUNTCZAN.



THE August [1887] number of *Harper's Magazine* was given exceptional artistic importance by presenting the first published account of the existence, in a remote and obscure corner of this continent, of a superb art-treasure; nothing less than a great painting believed to be one of the masterpieces of Titian. The account was given in Mr. Charles Dudley Warner's interesting series of "Mexican Notes."

The eminent artist Mr. Frederick E. Church is the one who made the discovery of this work in what is now an obscure Indian village in the heart of the interior of Mexico. Mr. Church and his wife had recently spent several winters in Mexico, and the writer of these lines, who was there in 1883 and 1884, recalls the enthusiasm with which Mr. Church told him of encountering this wonderful picture. Though Mr. and Mrs. Church were both invalids, their love of the grand scenery of the country led them to undertake journeys and endure hardships from which many a robust person would shrink. On their way to Morelia, the capital of the beautiful State of Michoacan, they had obtained in Lake Cuitzeo, along the shores of which the Mexican National Railway runs for some distance, a taste of the charms of the picturesque lake-region of Mexico. Hearing while in Morelia — a city to which they became deeply attached; and justly, as may be imagined from Mr. Warner's fascinating description in the July *Harper's* — of the beauties of Lake Pátzcuaro, they resolved to go thither, notwithstanding the fact that the city of Pátzcuaro, near the lake, could, at that time, only be be reached by a rough diligence journey of something like forty miles, although it has recently been made accessible by a branch of the National Railway. They found Pátzcuaro delightful with its pure, invigorating air and noble scenery, and while there they took a trip down the lake, in a native dugout, to the Indian village of Tczintczuntczan, a distance of something like fifteen miles. The trip may now be made with less difficulty, for, within a few months, an iron steamboat has been placed on the lake by an American company. Here, in the ancient church, they found this wonderful old master, the value of which Mr. Church at once perceived, having a valuable gallery of fine old paintings, including two Murillos — one of which is the celebrated Santa Rosa of Peru — at his home, Olane, on the Hudson. With Mr. and Mrs. Church at the time was the talented young New York artist, Mr. Howard R. Butler, who made a hasty pencil-sketch of a portion of the picture. Mr. Church said that the effect of so unexpectedly finding this great treasure in the heart of the wilderness, as it were, here in the Western world, was indescribably pathetic. Mr. Church also spoke of the great olive-trees in the great yard of the church — described in Mr. Warner's article — as finer than any he had seen anywhere, even in the Holy Land. Mr. Warner doubts if the world can show elsewhere a more interesting group of these historic trees.

The name of the village, Tczintczuntczan, is said to signify "humming-bird" in the Tarascon vernacular, and its pronunciation resembles the sound of that bird. When Mr. Church first came across the painting, it is doubtful if any other American, at least any one who could appreciate its great value, had ever seen it, and its existence was known to very few outside the immediate vicinity. It is one of the few great paintings that escaped the spoilers when the churches and convents of the country were devastated in the war of the Reform, and is probably the most valuable of all the paintings by old masters that came to Mexico when it was the pet province of Spain. Even Madame Calderon de la Barca, who visited Pátzcuaro, and who was enthusiastic in her praise of the lake, does not mention this painting, although her cultivated mind took quick note of such things.

Mr. Church mentioned an interesting relic of Paganism which he observed in the same church that contains the painting, in the shape of two mountain lions vigorously hewn from stone, crouching on either side of the altar. They were idols in the days before the Spanish conquest, and it seemed strange to find them preserved in a Christian church together with the finest religious painting in the country.

Mr. Warner went to Mexico with Mr. and Mrs. Church in the winter of 1886, and visited Tczintczuntczan with them in March. He was profoundly impressed by the picture, as well as delighted with its environment, as may be seen from the following:

"In the enclosure are two ancient churches, one with a tower and bells, the parish church, gaunt and plain, the other, the chapel attached to the monastery. Both have an appearance of decay and non-use, the religious accommodations being now in excess of the dwindled population. The monastery, with its outer stairway, gallery and courts, is a decidedly picturesque old pile, with color subdued, but not much faded. The adjoining chapel is large, and not above the average of Mexican church interiors in interest, and the cloisters are beautiful. In the centre, walled by a low parapet, and open to the sky, is such a garden as one finds in the decaying monasteries of Italy, with orange-trees, and a tangle of vines and a cat asleep in the sun. The cloister is of two stories, with round arches, one above the other; the ceiling corners are of wood carved in arabesque, as in Moorish architecture. On the walls are very rude and highly-colored paintings, representing the rites of baptism, confirmation, confession, and so forth. It is altogether a bit of the Old World, and one has here indefinable sense of peace and repose.

"The aged priest who has charge of the premises and lives in apartments above the cloisters, the only intelligent man in the village, was unfortunately absent, and we had difficulty in persuading the girl who answered our call from the upper gallery to come down and unlock the sacristy door. In the sacristy is the treasure of Mexico. The room is oblong, and has windows only on one side, toward the west, broad windows closed with wooden shutters. On the walls are several, so-called, sacred daubs and a number of uncouth and rubbishy images. But across, and filling one end over the vestment chest, hangs 'The Entombment,' by Titian. The canvas, which is enclosed in a splendid old carved wooden frame, is fifteen and one-half feet long. It contains eleven figures, all full-size. In the upper left-hand corner is a bit of very Titianesque landscape, exactly like those which Titian was fond of introducing into his pictures, and which his contemporaries attributed to the influence of his birthplace, Pieve di Cadore; on a hill are three crosses in relief against an orange sky. In the lower left-hand corner is Mary Magdalen seated on the ground, contemplating the nails and crown of thorns. In the lower foreground, very realistically painted, are an ointment box and a basin.

"The figure of Christ, supported in a sheet, is being carried to the tomb — a dark cavern in the rear. Two men, holding the sheet, support the head, and one the feet. Aiding also in this tender office is a woman, her head bowed over that of the dead Christ. Behind is St. John, Mary the Virgin, Mary whom Christ loved, and St. Joseph. There are two other figures, partially in shadow at the right, spectators of the solemn scene, and one of them is said to be a portrait of Philip II.

"The flesh-painting of the central figure is marvellously fine in imitation of the rigid pallor of death, while that of two of the figures carrying the body is equally true to robust life. The 'St. John' is exquisitely beautiful in drawing and color, conveying the traditional grace and manly tenderness of the beloved disciple. The vestments are in Titian's best manner, the reds and deep blues harmonious and beautiful in tone.

"The grouping is masterly, natural, free, and as little academic as such a set scene well can be. Indeed, composition and color both proclaim the picture a great masterpiece. As you study it you have no doubt that it is an original, and not a copy. It has the unmistable stamp of genuineness. The picture, thanks to the atmosphere of this region, is in a perfect state of preservation, the canvas absolutely uninjured.

"Is this great picture really a Titian? It seems incredible that a work of this value and importance should be comparatively unknown, and that it should be found in a remote Indian village in Mexico. But the evidence that it is a Titian is strong. It was sent to this church by Philip II, who seems to have thought that no gift was too costly or precious for the cause of the true faith, and who, no doubt, was deceived by the exaggerated Spanish narratives of the native civilization and taste. Titian, we know, visited at the court of Philip, and executed works to his order. It is possible that this picture is a replica of one somewhere in Europe. I think that any one familiar with the works of Titian would say that this is in his manner, that in color and composition it is like his best pictures. I trust that this description of it will lead to some investigation abroad that will settle the question.

"We stayed in the village several hours, and returned again to look at the picture before we left. The western sun was shining into the broad windows, illuminating the shabby apartment in which it hung. And in this light the figures were more lifelike, the color more exquisite, the composition lovelier, than before. We could not but be profoundly impressed. I cannot say how much was due to the contrast of the surroundings, to the surprise at finding such a work of art where it is absolutely lost to the world and unappreciated. I say unappreciated, for I do not suppose there is a human being who ever sees it, except at rare intervals a foreign visitor, who has the least conception of its beauty. And yet these ignorant natives and the priest who guards it are very much attached to it, attributing to its presence here, I think, a supernatural influence. They will not consent to part with it, perhaps would not dare to let it go. A distinguished American artist was willing to pay a very large sum of money for it; the Bishop of Mexico made an effort to get possession of it and carry it to the capital; but all offers and entreaties have been refused and resisted. How long it will be safe in a decaying building, in the midst of a population that have no conception of its value as a work of art, is a matter of conjecture."

The pencil-sketch which furnished the illustration for Mr. Warner's article was probably made by Mr. Church. Slight though it is, it is

sufficient to indicate the masterly quality of the painting as a composition, though, of course, it can give no idea of its superb color. It is to be hoped that Mr. Warner's article will lead to the complete identification of the work.

Meanwhile, let us examine the accessible sources that may give us some information on the subject. Recent investigations seem to establish that Titian never went to Madrid, as stated by Mr. Warner, although he was highly honored by Philip II, as well as by the other leading sovereigns of Europe. Palomini maintains that Titian was in Madrid from 1548 to 1553, but, according to Nagler, this is incorrect, since in 1548 he was employed in Germany by the Emperor Charles V. Gaye, however, produces a letter from Philip II to Titian written in 1561, and a patent from the same monarch to the artist in 1571. These dates appear to indicate the period in which Titian was painting for the Spanish court. He may, however, have been much earlier in Madrid, since he painted Philip II as a boy and also as a young man, whose friendly countenance gives no sign of the gloomy nature of the tyrant he afterwards became.

Titian's connection with Philip II began at Augsburg, on his second visit to that city, in 1550, whither he was summoned by the Emperor Charles V, Philip's father, to make a likeness of the prince, then twenty-four years old. Titian found great favor with Philip, and the connection was kept up until the artist's death. Many of his masterpieces were painted expressly for Philip, and forwarded from Venice to Madrid, but it appears that Titian never visited the Spanish capital.

The first "Entombment" which we find mentioned in connection with Philip II must have been a notable work, but, unfortunately, it was lost, as appears from a letter written by Philip to Count de Luna from Brussels, January 20, 1559, making a complaint that a large canvass of that subject, despatched by Titian from Venice in November, 1557, and received shortly after at Trent by the postmaster, De Tassis, had never reached its destination. He desired a search to be made for the missing work, and gave directions for the discovery and punishment of the thieves.

On July 13, 1559, Philip wrote from Ghent asking for a second version of the "Entombment" to replace the missing painting. On August 3 of that year Secretary Garcia Hernandez wrote from Venice to Philip concerning Titian's work in hand for the monarch, saying: "He will give me the 'Christ in the Tomb,' of larger size than that which he sent before, the figures being entire."

In September, Titian wrote to Philip: "I send your Majesty the 'Actæon,' 'Calisto' and 'Christ in the Sepulchre' in place of that which was lost on the way, and I rejoice that, though larger, the last of these pictures has succeeded better than the first, and is more worthy of acceptance from your Majesty. I attribute this improvement in a great measure to the grief which I felt at the loss of the first example, which proved a strong stimulus to exertion in this and my other works, in order doubly to recoup the damage."

In the "*Life of Titian*," by J. A. Crowe and G. B. Cavalcaselle, published in 1877 and drawn chiefly from new and unpublished sources, the foregoing information concerning Titian's connection with Philip is found. Of the subject under consideration the same work says:

"In the 'Entombment' which accompanied the 'Calisto' and 'Actæon' to Madrid, Titian repeated a subject which he had studied frequently since the first example of it had been sent to Mantua some thirty years before. Comparing the picture, as executed for Federico Gonzaga, with that produced for Philip II, we may be struck as with something familiar lingering undefinedly, though still indelibly, on the mind. It is not that the theme is exactly the same in both pieces, since different moments in the action of entombment are represented, but that in both we observe generally the dead body of Christ, the agony of Mary, the grief of the Evangelist and the wail of the Magdalen. The same figures do not affect similar action in both compositions, but certain rythmic movements recur, as that of the man stooping over the form of Christ and presenting the back of his head and frame to the spectator, and that of the Virgin looking with anguish at her Son. Besides these, we have modifications of types which are to be found as studies of expression in single canvases. The Magdalen is still the model which graced the 'Venus Worship' at Madrid, or the 'Entombment' of the Louvre; the Virgin is nearly related to the grieving 'Madonna' which we saw displayed at the death-bed of Charles V. But here the Saviour is not carried to the tomb. He is lowered into it, and the sepulchre presents to us its marble sides adorned with bas-reliefs of antique carved-work. The legs of Christ are nearer to us than His head, but the foreshortening is so cleverly managed that the parts which might have seemed too near to be in focus are concealed in the grasp of the bending Nicodemus, while the head grandly reposes on the breast of Joseph, who kneels at the opposite end of the grave with a strong grip of the body under the arm-pits. The flexibility of the frame, the raised legs and hanging hand are very grandly represented. The Virgin, taking the left arm of her Son, which she hopes to kiss, still hovers over him with an agonized look expressed with great force. With equal power we note the grief of the Evangelist behind Mary, who wrings his fingers, and the wail of the Magdalen, whose yellow robe flies and leaves her white dress exposed as she comes sobbing and hair-dishevelled to catch a last glimpse of the Redeemer. There is no such gorgeous coloring, no such magic effect of light, no such careful definition of outline or gloss and grain of surface in this as in the Mantuan example, but it is the work of a man much more expert and practised than of old—of a man who knew the laws of composition and applied them, a man acquainted with inexhaustible varieties of expression, a realist who knows every action of body or limb by heart. Less rich in tints, less engaging in form, less select in features, the *dramatis personæ* at Madrid are superior to those at the Louvre, inasmuch as they are more true to nature and have a deeper meaning. Less highly colored, they bear closer inspection, and the nude especially is modelled with appropriate shades of tone with a decision and firmness which left almost nothing for subsequent glazing or blending. It is, in fact, as if we should distinguish the grave doctrine and depth of Bach from the playful and melodious power of Mozart, or compare the profound but realistic Rembrandt with the brilliant and cavalier-like Van Dyke."

"The 'Entombment' at Madrid was frequently repeated," says the same authority, "not only by Spanish and other craftsmen, of which examples may be found in Spain and in England, but by Titian himself or his pupils. One of the replicas to which Titian personally may have contributed is that which came into the Mantuan gallery, and is traced to the collection of Charles I and James II of England. Another may be that which passed into the hands of the Prime Minister of Spain five years before Titian's death. At a conference held between Antonio Perez and the Venetian envoy, Donato, in 1572, the former expressed a strong wish to become possessed of one or two pictures by Titian, and Donato hastened to communicate this wish to his government. The consequence was that the Council of Ten sent a competent judge to Titian's house, who chose two canvases, one sacred and the other profane, and these were forwarded by the next opportunity to Spain. Shortly after this Antonio Perez fell into disgrace, and suffered imprisonment for alleged treason. His family, in want of funds, announced an auction of his pictures, and of these the Imperial envoy, Khevenhiller, made a report to Rudolf II, describing, amongst others, the 'Entombment' by Titian, as a replica of the King's at the Escorial. It is not known what became of the picture after this report, but some persons think that it may have remained in Spain, from whence it was taken by the Duke of Buckingham in 1622. There is no doubt that an 'Entombment' by Titian formed part of the Duke's collection, and this was sold at Antwerp after his death to the agents of the Archduke Leopold William. Comparing this piece, which is now at Vienna, with the earlier one at Madrid, we may concede that it is the same composition, yet with varieties. For here the Magdalen is represented wringing her hands, whilst little more than the head of St. John the Evangelist is seen between the profile of the Virgin and the shoulders of the saint next him. Unhappily, the canvas appears to have been mutilated and patched up anew, and this treatment may have caused injuries which prevent us from distinguishing much of the personal labor of Titian. The master himself never thought out any better design of the subject than that which he used at Madrid; the sketch—pen-and-ink-and-bistre heightened with white—is still preserved in the collection of Oxford University, and showed that Titian seldom made preparatory paintings in oil, but simply finished large pictures from drawings."

We learn that the picture sent to Philip II, in 1559, is that which now appears numbered 464, measuring 1.37 metres in height by 1.75, in the Madrid Museum. Unlike the "Diana and Actæon" and the "Calisto" it was not given away to Charles Stuart or to the Duke of Grammont, and it remained for centuries the ornament of the altar in the Iglesia Vieja at the Escorial, after having been in Philip's lifetime on the altar of the Royal chapel at Aranjuez. On a sheet fastened to the right side of the sepulchre is the inscription, "*Titianvs vecellivs æqves cæs.*" "Half the composition is relieved (to the left) on a dark wall, the other half on a landscape. The saint at Christ's head is in brown, the other at the feet is in red, with a striped sash. The white winding-sheet falling over the bas-relief of the tomb gives some subtle varieties of light."

Another "Entombment" in the Madrid Museum, is numbered 491, and is on a canvas 1.30 metres by 1.68. It varies in so far that the saint on the extreme right wears a robe embroidered with black flowers, the tomb is without bas-reliefs, and the word *Titianvs f.* is written on the stone of the left side. "But the execution is not that of Titian or his pupils, but that of a Spaniard who may be Del Mazo." P. de Madrazo's catalogue shows that a copy of this "Entombment," by Del Mazo, once rested on an altar in the chapel of the Alcazar at Madrid. A second copy of the "Entombment" is still in the Iglesia Vieja at the Escorial.

The "Entombment" at Hamilton Palace is a free adaptation, with figures of life-size in a gloomy landscape. "At Christ's head are two bearded men. The Magdalen wrings her hands. The figure in the right foreground holding the feet is only seen to the thigh. The style is that of a follower of the Bassani, a Spaniard rather than an Italian, who loses the lines of Titian's composition, and tries in vain to reproduce his rich colors. His general tone is hard and red."

That of Ambrosiana, Milan, "again is a variety, with the Mary and a standing saint in prayer to the left; on the base of the tomb, '*Titianvs.*' But the handling is that of an imitator of the seventeenth century."

In the Torrigiani Collection, Florence, is another adaptation, with life-size figures of the Madrid "Entombment," with different dress. "The figures are all half-lengths, and lighted by a torch held by one of the men to the left. One of them, to the right, is much injured. On the whole a poor work of the seventeenth century."

The "Entombment," from the Duke of Buckingham's Collection, is in the Belvidere, at Vienna, No. 32, second room, first floor, Italian schools. "It has a strip of new canvas round three sides, and is signed on the right of the tomb '*Titianvs.*' The scene is an enclosed space and in gloom. When in the collection of the Duke of Buckingham, this piece was three feet high by four feet, six. It was engraved by Paul Pontius, at Antwerp, and then showed the full-length of the figures."

The earliest "Entombment," by Titian, of which we have record, is that known as the Mantuan. This work is ascribed to a period subsequent to the correspondence between the master and his patron, the Marquis Federico Gonzaga of Mantua, in 1523, for whom it was executed. It is called one of the finest performances from Titian's hand, since he finally lost the impress of Palmesque art. In the seventeenth century it passed from Mantua into the collection of Charles I of England, and since the days of Louis XIV has been an ornament of the Louvre. Of this work, Crowe and Cavalcaselle say:

"The 'Entombment,' though incomparably below Raphael's version of the same theme in respect of balanced distribution and complexity of line, is still for Titian a representative piece. It would be true to say that none of the figures perform all that they seem to promise, and that there is more of symbolism than of absolute reality in the action of every one of them; and yet the impression produced by the picture, as a whole, is probably much greater than that which we receive on looking on the Borghese altar-piece; and this arises, no doubt, from a surprising variety in type and expression, a subtile display of light surfaces upon a ground studded with diverse shades of gloom, and a richness of coloring which throws over the whole canvas a mysterious wierdness. Two men bending over the corpse of the Redeemer are supposed to bear the awful weight of His frame; St. John Evangelist behind merely holds up the arm; but these three figures alone form the pyramid of the composition, and the group of the Virgin and Magdalen on the left is but a splendid bit of *fioritura*. The body of Christ is suspended in a cloth, one corner of which is held at the hip by Nicodemus, the other tightly grasped at the knee by Joseph of Arimathea. Nicodemus, in a blood-red tunic of complex texture, with a green lining and brown sleeves, shows his back to the spectator as he strides and bends to his load, whilst Joseph, in a deep green coat and his shirt-sleeve rolled up, kneels with one leg on a stone and sways the body in the direction of the tomb. The Evangelist in rear, between both follows their movement and looks up as he raises the Saviour's wrist. To the left the Virgin, in a blue mantle, wrings her hands and partly rests on the supporting arm of the Magdalen, whose yellow dress and loosened hair flutter in the breeze. Taken singly, each of these figures is moving in a quick momentary way. The form of Christ is perfectly symmetrical, of great strength and preternatural size, the head majestically enframed in flowing locks and copious beard, the limbs and feet beautifully moulded and admirably drawn, the whole shape, if not ideal and 'god-like,' still a wonderfully supple and choice representation of select nature. The bearers finely display the raw muscle of strength in movement that looks spontaneous and true, whilst the action is cleverly promoted by earnest and telling expression; and yet in all this exhibition of contrasted inertness, motion and strain, there is much that is merely show. The effort of Nicodemus and Joseph is unreal, for the cere-cloth which they hold bears no trace of tension, and experience tells us that two men in these positions would hardly lift the manly load between them. But in spite of these incongruities and imperfections, which, indeed, defy detection unless we free ourselves from the charm that enwraps us, the scene looks real; and the faults are neutralized by modulations of darkness and gleams of light cropping up here and there with a startling vividness peculiar to Titian, or by tones of a penetrant force and richness which stir fibres that would remain inevitably motionless before pictures of the Tuscan School. Both light and shade and color are made subservient to the concentration of focal effect. Whilst the form of Nicodemus throws the head and frame of the Redeemer into darkness, the whole of the legs and parts about the hips shine brightly in the ray which strikes simultaneously on the dazzling white of the cere-cloth and illumines the bearded profile of Joseph, the fine-cut features of John, and the faces of the Marys, casting a lurid glare that fitfully flits from a break in the wind-beaten heavens. The same gleam sets the clouds in the distant sky into red edges, and sheds a depth as of night on the tree-tufted knoll to the right, in a recess of which the sepulchre is yawning.

"The 'Entombment' closes a period which opens with the 'Christ' of 'The Tribute-Money.' It still reminds us of Giorgione in the picturesque form and outblown hair of the Evangelist. It still recalls Palma Vecchio in a certain moulding of face and limbs, in shallow depressions of stuff in drapery and in contrasts that bring before us varieties of weather-beaten flesh in males and pearly skin in women. As regards color, effect and elevation of proportion, it is far ahead of anything that either Palma or Giorgione ever produced, whilst as regards expression and the rendering of passion no painter of the Venetian School can now compare with Titian. Not to speak of the calm repose of the Savior, or the busy intentness of Joseph, there is a wildness of anguish in the Magdalen, a depth of agonized grief in the Virgin and a tumult of feeling in the Evangelist which stir the soul, and for technical handling who shall say that Titian was ever surpassed, when he notes how subtly the livid faces are blanched by grief, and lighted with the sun's glare or pitted in tone against the glow of ruddy hair. Everywhere a grand facility and surprising versatility in touch. Here a surface worked out with liquid tint modelled into thin softness of film, there a great body of pigment with spare saturation and occasional charge of solid color, an intertress of delicate and studied blending, heightened by golden reflexes. But whilst the master still reminds us of his earlier companions in the field which he now occupies without a rival, he reveals to us also the sources from which his disciples in the Venetian School were inspired. Of Palma and Giorgione there sits a reminiscence which tells of that which has passed and gone, whilst certain forms like that of the bending Nicodemus or Joseph foreshadow the coming of Paul Veronese and Giacomo Bassano; and it is well thus early to note the spring at which these great provincials drew, because it is the fashion to urge that Titian took from them at a later period what, it is clear — they merely took from him.

"The 'Entombment,' 'a Mantua piece in the first privy lodging at Whitehall,' was sold to Jabach after the death of Charles I for £120. It had been a favorite, we cannot doubt of Van Dyck, whose style was greatly influenced by it. A clever Venetian — perhaps a disciple in Titian's own workshop, made an exact copy of it, which, till lately, was preserved in the Manfrini Collection."

This work is registered in an inventory of the Mantuan Palace in 1627. It is now No. 465 at the Louvre, and is noted in Vilot's catalogue as 1.48 metres by 2.05. The Manfrini picture is of same size as the work in the Louvre.

This Manfrini "Entombment," is pronounced an original by Nagler, who, as may be seen from the following, terms the canvas in the Louvre a replica:

"Here," says Nagler, "Titian rises to the height of poetry, and has painted a soul-picture worthy to stand in beauty beside the works of Rafael and Francia. Particularly in the head of Mary is the acme of tragic pathos attained. The face of the Saviour in its color is the only unsatisfactory feature; in pose the figure is highly successful. Joseph of Arimathea, who has a splendid head with a beautiful black beard, holds the body by the feet. His face has an indescribable and most attractive expression of awe mingled with pity. Between the two figures is another assistant of an ordinary type, in whose face pity and sympathy have taken the place of vexation. On the extreme left is Mary. The face of the bowed mother is set with an expression of that deepest pain when the eyes are tearless; the pale hands are pressed together in agony. John, who stands with an incomparable expression of dividing his deep sorrow and care between the two beloved ones, holds Mary as she is sinking forwards. Here Titian has shown himself one of the greatest of spiritual painters — something that seldom occurs with him, since his sensuous surroundings have usually led him to care more for a splendid and beautiful superficial representation. The picture in the Louvre is a replica of this."

At least, one Titian is known to have been on this continent, for Mr. Bullock, of London, the founder of the Egyptian Museum, is stated by Nagler to have found in the United States, in the early part of this century, a great painting which appears to have come out of the collection of Charles V. It represents the siege of Tunis, and was painted in 1532 under the supervision of the Emperor. It came to London in 1841. It is sixteen feet long.

The importance of the subject has justified the foregoing details. There can be no doubt that the great painting at Tezintezuntezan is related to the notable group of "Entombments" by Titian, described in the foregoing. It is, of course, too early to establish whether it is an original from the master himself, the work of one of his pupils, or a copy or variation by some other painter. The indications point, however, very strongly towards the correctness of Mr. Warner's theory. If it is not an original by Titian, it must be either a copy or a variation of one of his works. No trace, however, is found of an original of this picture, either in European collections or in the records of Titian's work. Its size and its striking excellence as a composition — sufficiently manifest even in the reproduced pencil-sketch accompanying Mr. Warner's article — make it seem improbable that it is a variation. History tells us of two "Entombments" by Titian, of whose whereabouts nothing now appears to be known, and the conjecture naturally arises whether this work in Mexico may not be one of these. It might not be unlikely that the first one painted for Philip II and lost on the way should have finally turned up and have been sent to Mexico by the monarch. But it will be seen that this could not have been that one, for the picture painted to replace it is stated to have been larger than the lost one, and yet the Madrid work measures only 1.75 metres in length. That of Tezintezuntezan, however, with a length of 15½ feet, according to Mr. Warner, is more than twice as long as that of any of the other Titian "Entombments" known, and it contains a greater number of figures.

The other "Entombment" of which trace has been lost is that stated to have been in the collection of Philip's Prime Minister, Antonio Perez, supposed to have been the sacred subject mentioned as having been purchased of the master in Venice. To be sure, the Perez picture has been described as a replica of the King's at the Escorial, but possibly this may have been an inaccuracy, referring to its having the same subject, though, had it been the work now in Mexico, it seems probable that its greater size would have been mentioned. At all events, it seems to be pretty well established that the latter came to the church at Tezintezuntezan as a present from Philip II, and the Perez work is the only Titian known to have been

in Spain at that time which might have been the same. Of course, however, it is possible that the Mexican work might have been obtained by Philip II without the record of the transaction having been preserved.

The sketch in *Harper's* shows a close kinship of the work in Mexico to the "Entombment" in the Louvre. The composition more nearly resembles the former than that of Madrid. Here, also, the dead Saviour is carried into the tomb supported in a sheet, instead of being lowered into the sepulchre, as in the latter work. In both composition and action, however, it is indisputably superior to the Louvre "Entombment," and must, therefore, be of a later date. The faults emphasized in the criticism of the Louvre picture quoted above are not evident here. It is the work of a riper period. It seems as if the artist, aware of the deficiencies in the Mantuan picture, had in this work gratified a desire to give the motive a more adequate illustration. The Louvre "Entombment" is the reverse of this in position, and the close resemblance between the two compositions may be seen by beholding an engraving or photograph of the former reflected in a mirror and comparing it with the sketch in *Harper's*. The resemblance in the figures of the Virgin and of St. John, and of the stooping man at the head of the corpse with his back partly towards us, is particularly striking. The superiority of the Mexican work in action is manifest in the two figures supporting the head of the Saviour, particularly in the uneven step of the nearer one — exactly that of a man bearing a difficult burden. The body of the Saviour, also, has the calm repose of death, while in that of the Louvre it seems more like that of a sick or wounded man.

Should it be established fully that the largest and best of Titian's "Entombments" exists in this remote Mexican village, it would be sufficient to make the place, with its beautiful location by the lake, its romantic and picturesque situation and its perfect climate, one of the greatest art-shrines in the Western World. Much as it would adorn an art-museum in a great city, its effect in such a place would be incomparably greater, more certain to touch a responsive chord in the breast of the appreciative beholder, and it alone would make it worth while to undertake a journey to Mexico. If it is possible to secure its freedom from harm in its present location, it is to be hoped that it will continue to remain there.

Sylvester Baxter.

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

EAST END OF DINING-ROOM IN THE HOUSE OF HON. WHITELAW REID, MADISON AVE., NEW YORK, N. Y.

[Gelatine Plate.]

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. ALEXANDER HAY, ARCHITECT, LOWELL, MASS.

[Issued only with the Imperial Edition.]

SKETCHES BY A ROTCH TRAVELLING-SCHOLAR. MR. E. A. JOSSELYN.

[Issued only with the Imperial Edition.]

HOUSE OF CHARLES L. CUSHMAN, ESQ., AUBURN, ME. MR. G. M. COOMBS, ARCHITECT, LEWISTON, ME.

[Issued only with the Imperial Edition.]

CHATEAU DE JOSSELIN, MORBIHAN, FRANCE.

In our issue for February 27, 1886, we published a view of the façade which fronts on the court of honor very different in style from the fortress-like portion that overhangs the Oust, the oldest portion of this building. The round towers are founded on the natural rock and the walls of the building follow the trend of the rocky river bank. The building which belongs to the Prince de Léon was in a great measure restored in 1867. The general picturesque character of the little town in which the château stands is shown in the companion drawing.

RUE DU CHATEAU, MORBIHAN, FRANCE.

VIEW TO THE COURT-YARD OF THE CASA DE PILATOS, SEVILLE, SPAIN.

Mark of a Revolutionary Riot. — Very few, if any, of the thousands who daily pass the park at Bowling Green are aware that the railing around the park bears silent but the liveliest kind of testimony to a revolutionary episode. All the posts are broken at the top. They once bore round knobs with the medallions of George III, which were broken off by the angry patriots. — *New York Press.*

THE "WORKING-DAY" IN VARIOUS COUNTRIES.[1]



An exceedingly interesting report has recently been issued by a committee of the British House of Commons on the "hours of work in foreign countries." The information has been obtained from Her Majesty's representatives in the various countries dealt with, with the object of comparing the condition of the British workman with workmen in other lands.

The report shows that legislation on the subject in the United States is far from being uniform. In New York, an Act passed in 1870, prescribes eight hours as the legal day's work for all classes of mechanics, workingmen and laborers, excepting those engaged in farm and domestic labor, but overwork for extra compensation by agreement is permitted. So far, it may be presumed, that the Act simply operates to enhance the rate of wages.

Another section of the statute makes this Act apply to all mechanics, workingmen and laborers employed by the State or any municipal corporation therein, through its agents or officers, or in the employ of persons contracting with the State or such corporation for performance of public works. A violation of the Act constitutes a misdemeanor.

An Act passed in 1886 makes twelve hours' labor in twenty-four, with reasonable time for meals, a working-day in respect to the street surface, and elevated railroads chartered by the State in cities of over half a million inhabitants. An Act passed in 1887, referring to cities of one hundred thousand inhabitants and over, makes ten hours the limit, within a range of twelve hours.

In New York and other cities in the State, nearly all classes of mechanics and all connected with the building-trades work nine hours per day, excepting on Saturday, when eight hours is the rule.

In Connecticut the only act on this subject is one making eight hours of labor performed in any one day "by any one person" a lawful day's work, "unless otherwise agreed." As a fact, with very few exceptions, the hours of labor of mechanics and other laboring people, are ten per day, or sixty hours per week.

In Maryland a powerful movement for shortening the hours of work was set on foot in 1886, resulting in a partial success for trades demanding nine hours a day, and a failure for those demanding eight. On the whole, ten hours a day make the actual working-day in Maryland for men and nine for women. In many cases throughout the States it is to be observed that while the law prescribes a certain limit to the hours of labor, it permits more extended hours to be adopted "by agreement."

In France the hours of adult labor are regulated by a series of decrees, of which the earliest sanctioned by Parliament promulgated in September, 1848, enacts that the workingman's day in manufactories and mills shall not exceed twelve hours of "effective" or actual labor. A decree issued in May, 1851, exempts certain workers. Among these we find stokers and firemen, together with persons employed in such occupations as the manufacture of glue, soap-boiling, milling, printing and lithographing, casting, refining, tinning and galvanizing metals, and making projectiles of war. Two additional hours are described as "granted" in sugar mills and refineries, and in chemical-works. Other exceptions are allowed for limited portions of the year. In 1885 a circular was issued by the Government stating that the limit of twelve hours per diem was not to be imposed where hand-power was employed, but was to be confined to factories and mills in which the motive-power was steam. No workshops were to come under the clauses of the Act that did not employ more than twenty hands in any one shed.

In 1889, another decree exempted from the law of 1848, laborers employed on any works executed by order of the Government in the interest of the national safety or defence. The report sent to Lord Salisbury on this subject, says: "It is likewise to be borne in mind that there is in France no compulsory observance of Sunday, and no day of habitual rest."

The narrow scope of the law prescribing a maximum of twelve hours "effective labor" is shown by the fact that while recent Parliamentary reports state there are in France between six and seven million persons earning daily wages, the reports of the Inspectors of Factories only record a population of three hundred and fifty-nine thousand adults subject to the Act of 1848, of whom forty-

[1] From the London *Standard* (rearranged).

one per cent are women. Accordingly the report of the British Foreign Office says, it would appear that, beyond this comparatively small number, the great majority of working-people, masons, laborers, smiths, carpenters and others, are free to work for any number of hours that may suit their inclinations.

A careful perusal of the reports of French Inspectors of Labor appears to show that the Act of 1848 is very loosely interpreted. It is even doubtful whether the section limiting the actual working-day to twelve hours was intended to include or exclude hours of rest. Practically, the legal time is made to exclude rest. This makes the working-day so much longer. "Effective" time often extends to thirteen and fourteen hours in many weaving establishments. As a rule, Frenchmen are present in the shops at least fourteen hours out of every twenty-four.

In the reports which treat of Belgium we meet with a singular piece of independent testimony to the forwardness of England in factory legislation. This occurs in a document drawn up by M. Van Cleemputte, member for Ghent and reporter of the Committee of the Chamber of Representatives on the bill introduced by the Belgian Government for regulating the work of women and children in industrial establishments. After sketching the legislation of foreign countries on the subject, the report points out that Continental Europe has been preceded in this matter "by the country which, of all others, regards with the greatest suspicion the interference of the executive: it is the Classical land of *laisser faire*, aristocratic England, which has set us the example." The committee responsible for this report enlarged the bill so as to include regulations for women and children.

Concerning the actual hours of adult labor in Belgium, some difficulty is said to be experienced in getting at the facts. The evidence given before a Belgian Royal Commission showed that railway-guards are sometimes on duty for fifteen and even nineteen and a half hours at a stretch, and the Brussels tramway-drivers are at work from fifteen to seventeen hours daily, with a rest of only an hour and a half at noon. Brickmakers work during the summer months sixteen hours a day. In sugar-refineries, the average hours are from twelve to thirteen for men, and from nine to ten for women. The cabinet-makers both at Ghent and Brussels assert that they often have to work seventeen hours a day.

Apart from more laborious occupation, Mr. Gosselin, of the British Legation at Brussels, is inclined to give eleven hours as the average day's labor in the majority of trades in Belgium, writing at the close of June (1889). Mr. Gosselin states that as yet there is no law in Belgium regulating or limiting the hours of adult labor. But underground labor is forbidden for boys under twelve and for girls under fourteen years of age.

In European countries, the strict terms of the law are often subject to "modification" by a Minister of State.

In Austria, the law provides that the duration of work for factory hands shall not exceed eleven hours out of twenty-four, "exclusive" of periods of rest. These are not to be less in the aggregate than an hour and a half. The rule can be modified by the Minister of Commerce in conjunction with the Minister of the Interior, allowing longer hours for a limited period.

In Switzerland, the law provides that a normal working-day shall not exceed eleven hours, reduced on Saturdays and public holidays to ten. Power is reserved for prolonging the working-day in certain circumstances.

Among the countries having no laws affecting the hours of adult labor, Germany is conspicuous, together with Russia. Of Greece it is declared that the "social conditions of this country have not arrived at that point of progress where the interference of the State between the employer and the operative becomes necessary."

BOOKS AND PAPERS.

UNTIL within a few years Spain was a terra incognita to most travellers, whether they were influenced by the ordinary purposes of the sight-seer, or carried with them the more serious intentions of the architectural student. The great peripatic race, the Anglo-Saxon, both English and American branches, found that the discomforts they would have to endure when exaggerated by the seclusiveness and hostility of the conservative Spaniards made the life of a bird-of-passage anything but an agreeable one, and, though now and then some one did succeed in making a fairly comprehensive trip, the impression that most people had of Spain and its buildings was such as could be derived from the arid surroundings and barren architecture of Madrid, the wonders of the Alhambra at Granada, and the interesting things that could be seen at Seville, Cordova, Toledo and some of the cities of the coast, all of which places have been for a long time accessible to the ordinary traveller. But the marvels of Spanish Gothic and later works, with their strange blending of Romanesque virility and Moorish femininity, that are to be found at Salamanca, Valladolid, Zamora, Burgos, Segovia, Oviedo and other less well-known places in Northwestern Spain were rarely visited by any one, and still less frequently by members of that advance-guard of modern architectural progress, the wandering photographers. The many improvements that have been made in the portability of photographic paraphernalia, the invention of the dry-plate and the film negative, have changed all this, and in the last half-dozen years professional and amateur photographers have wandered through the length and breadth of the land, and have returned laden with spoils, for which they find a ready market, for architects, having once learned something about the quantity and quality of the material that has for so long lain hid from them in the inaccessible wilds of Northern Spain, welcome with eager avidity all that these useful purveyors bring them. At the same time, the ameliorating influences of modern civilization have spread themselves through Spain *pari passu* with the introduction of railways, and the traveller who will stay at home if he cannot be surrounded in his journeyings with something akin to the comfort he meets with in other parts of Europe now no longer hesitates to risk his temper and his health in a trip through Castile and Leon.

Those who recall the history of the country, its occupation by the Romans, the incursions of the Carthaginians, the inroads of the Gallic tribes and the Vandals, succeeded by the occupation of the entire country by the Visigoths, the introduction by these of the Arabs into the country, which ended in the subjugation of the southern part of the peninsula to the upholders of the tenets of Moslemism, would be led to expect, and not in vain, to find traces of Roman, Gallo-Roman, Phœnician and Arab remains in better or worse states of preservation, and in greater or less quantity. Then, too, when is remembered the vast wealth which in the fifteenth and sixteenth centuries was poured into the country from the Spanish possessions in America, it is only reasonable to look for buildings built in the prevailing styles of those times, on which no inconsiderable portion of this income had been lavished, and here again expectation will be more than realized. But Spain was so devoted a daughter of the Church, and was so insistent in promoting all her plans for the propagation of the true faith with all the support that men and money could afford, that the permanent evidences of the possession of great wealth are not so numerous as would have been the case had France or Italy had the disbursing of the same funds. It was the wars of Charles V and Philip II, particularly of the latter, which were carried on for the purpose of stamping out Protestantism in the Low Countries, that bankrupted the country, and naturally, while money was being used for the procurement and sustenance of the mighty armaments that were kept in the field for years because of the unconquerable obstinacy of the amphibious Dutchmen, it could not be used for building purposes. Nevertheless, Philip found means to keep hands on enough to build the famous Escorial Palace some thirty miles from Madrid, which he had vowed to build to the honor of St. Lawrence — on whose day the battle of St. Quentin was fought — provided that he won the day. This famous but most cold and cheerless building was designed by Juan Baptista de Toledo, though it was carried out during the score of years it was building by Juan de Herrara, whose name is most usually associated with it. A greater contrast could not well be conceived than that made by this building, sometimes called the "eighth wonder of the world," the special glory of the second and purest period of Spanish Renaissance, and some of the famous works of Moorish architecture in Southern Spain. A general view of the Escorial, taken from a different point-of-view from any we have before seen, is contained in the portfolio before us — a portfolio which affords the promise of one of the most attractive contributions to the literature of architecture that has ever been compiled with the aid of that most useful of coadjutors, the enterprising photographer, who works with his head as well as with his hands.

It may be recalled that some eight or ten years ago we published some colored prints of the aqueduct of Segovia and the Puerta de Dore Cantos at Toledo and then stated that they were reproductions after some colored prints which owed their existence to some Russian or Polish nobleman, who had travelled through Spain with an extremely capable artist in his train, and had, on his return, published the results of his studies in Spanish architecture, in a manner and with a sumptuousness that only a thoroughly educated man, and a nobleman at that, could accomplish.

The present work, we imagine, owes its being indirectly to similar travels and investigations undertaken by Adolf Friedrich, Count von Schack, to whom it is so warmly dedicated, with a reference to the very unusual value of the investigations made by him at a time when it was no easy matter to travel in Spain. This new work is to be published in six parts, in portfolio, containing each twenty-five gelatine prints, 14″ x 20″, with a certain amount of descriptive text, at the very moderate price of ten dollars per part. The fact that the text is in that most laborious of civilized languages, the German, will not materially detract from the value of the plates to those who do not read that language, for each plate bears in Spanish, German and French the name of the building or view shown, the particular epoch or style to which it is to be ascribed, the actual date of the building and as often as possible the architect's name — pretty much everything, that is, that an architect cares to know.

The first portfolio contains a miscellaneous assortment of plates ranging between Plates 2 and 134, and so gives an admirable idea of the scope and character of the entire work, and contains as representing the Arabic style, the plan of the Mosque at Cordova and two interior views, which admirably show the bewildering forest of

[1] "*Die Baukunst Spaniens*" in ihren hervorragendsten Werken, dargestellt von Max Junghändel, Architect. Dresden: J. Bleyl. Sole Agents for the United States, Brentano Bros., Chicago.

columns and arches which make this one of the most impressive interiors the world contains. The Moorish style is represented by a view of the Alhambra and four interior views, familiar enough, but here beautifully presented. The Mudejar style, that graceful hybrid which represents the blending of Moorish now with the Spanish Gothic and now with the Spanish Renaissance, is shown by but a single plate which has so appealed to our appreciation that we have had it translated into ink, so that it might find a place with the illustrations of this issue. The Romanesque work is rather meagrely represented by a very huddled-up view of the east end of the old Cathedral at Salamanca, and the Church of St. Stephen, at Segovia. Two views of Burgos Cathedral, which one never wearies in looking at, give an idea of what Spanish Gothic in its latest stages was, while of the three other plates of Gothic work the interior of San Juan de los Reyes, at Toledo, shows traces of work that might fairly be called Churrigueresque, so blatant is its flamboyancy and exuberance. Churrigueresque work — the last stage of the Spanish Renaissance — is not otherwise represented in this fragment of the publication, but there are half a dozen plates devoted to the first stage of the Spanish Renaissance, the Plateresque, which is, after the Moorish work, perhaps the most typical architectural production of the country, and the one, moreover, which is likely to be of most interest to architects of to-day, in that it offers suggestions which can be adapted to the needs of modern building in any country. It is a strange jumble of styles and forms, but, in spite of its arrant and unreasonable eclecticism, it is almost always graceful and interesting.

There is, perhaps, not more than one of these plates which lack a very real interest, and if we say that we never saw together twenty-five plates which had a greater or more varied attractiveness it would not be saying too much. The execution of the work is worthy of the conception, and Herr Junghändel who selected the subjects, the photographer who made the negatives and the printers who produced the plates have good reason to be satisfied with their labor; and if faithful work is ever properly repaid they will probably not repent of their undertaking. The work is one to hoard one's money for and buy, even if one cannot really afford to do so.

OF making many books there is no end, and it is to be presumed that there never will come a time when some writer cannot be found who has a last conclusive word to say upon the very gnarled and venerable subject of the strength of beams and columns. The mediæval architects and builders were reasonably free from any such literary tendencies, contenting themselves with gradually paring down their columns and lengthening the spans of ceilings until the practical results of a few buildings tumbling about their heads convinced them that the ultimate strength of the materials had been reached. In more modern times the experiments have been conducted chiefly on paper, and mathematicians have successfully figured to a fraction of a pound the ultimate resistances of building materials, but with the curious results that the columns and beams yearly grow heavier and heavier to correspond to new laws and safer constants, though the theoretical strength remains the same. Mr. Cousins's recent work [1] is in the line of progression, boldly claiming that the ultimate and the elastic limit strength of beams and columns is computed from the ultimate and elastic limit compressive and tensile strength of the material by means of formulas deduced from the correct and new theory of the transverse strength of materials. The first general impression of the work is exceedingly satisfactory. It starts out by frankly admitting the difficulties of the accepted theories of strains, and proceeds to rationally investigate causes and effect. But within less than a dozen pages the difficulties begin by the introduction of the differential calculus, that triumph of the engineer and the despair of the architect, into the determination of a lever-arm. Take so simple an equation as this:

$$\int_{0}^{x_t} \frac{Tx^2}{x_t} . bdX = \frac{Tbx^3}{3x_t}$$

It is doubtful if a dozen architects in the country could make head or tail to this, and still more doubtful if any of them would ever try. And so on through the book. It has excellent material, logical reasoning and exact deductions, but so encumbered with unnecessary mathematics that the only beings who could apply the knowledge it contains would be those whose building operations are confined to paper castles in the school-rooms of our higher colleges. Nor are the results commensurate with the efforts. A number of tables are given of the computed and experimental strengths of columns of various sorts, a portion of a single one of which will show that even this work has not solved the problems exactly. Thus, regarding the strengths of hard-pine posts of various sizes, the crushing strengths are given as:

Computed.	Experimental.
344,822 pounds.	409,000 pounds.
100,584 "	97,330 "
231,516 "	199,830 "
249,253 "	281,000 "
170,800 "	126,350 "

Of these results of computation, as compared with actual tests, the theory gives a strength of 32 tons, or 15.6 per cent too small in the first experiment quoted, and 22 tons, or 35 per cent too large in the last. On the whole, we would prefer an empirical formula. After all, why should our abstruse mathematicians bother themselves so tremendously about producing an exact equation, when it is so very much simpler to actually crush a column or break a beam and totally disregard all theorems? No one pretends to have the slightest confidence in any theory of strength which is not substantiated by actual experiments, and, though the author of the work in question has struggled bravely, and has taken an evident satisfaction in the resulting complications, we question whether a return to mediæval methods would not be much simpler, and, on the whole, quite as satisfactory.

A COLLECTION of articles contributed at different times to the columns of *The Blacksmith and Wheelwright*, and covering nearly the whole range of blacksmithing from the simplest job-work to the most complex hand-forgings, constitutes the basis of a work [2] which is so evidently written for specialists and mechanics that it can have only an indirect interest to architects and amateurs. The volume in hand is marked so as to give the inference that a second one is to follow. If some one could devise a work which would arouse in our modern blacksmiths a little of the spirit which animated the old forge-artists of past times, it would have a meaning and a mission which every one could appreciate. The blacksmith, as an artist, has ceased to exist. Every architect knows how difficult it is to obtain really good forged-work, however simply designed: for between the file, the emery-wheel and the varnish-pot, nine-tenths of our wrought-work loses all of its artistic effect; and the hammer, which, though generally thought of as a rude and primitive instrument, is really in some of its uses a very refined one, has, in the hands of our modern workmen, been used merely as a tool, with no thought of its artistic possibilities. Our author recognizes this fact, but deplores it rather as a mechanical than an æsthetic failure. However, the book is all it starts out to be, and, though rather gossipy in detail, would make a mechanic the better for the reading of it, if only by teaching him to intelligently consider his tools and their possible application.

AT hardly any period in the world's history has brick been used so freely for building purposes as at present and at no time with so little real artistic success. This is made apparent in perusing the book before us,[3] which, as its very lengthy and much *et-cetera-ed* title informs us, is a compendium of all that relates to brick and terra-cotta. One does not look for a great deal of artistic information in a practical treatise, especially when the work is written from the standpoint of the commercial manufacturer; but the very slight attention given to even so important a feature as ornamental tiles, and the almost total disregard of the possibilities of brickwork, would seem to indicate a corresponding attitude on the part of the general run of manufacturers which does not speak very well for the standard of national taste. At the same time, a book which takes up the history of brick-making, tracing the manufacture to its origin about the delta of the Nile in the time of the early pyramid-builders and carrying the lines of growth down to the present day, is certain to contain within its 478 pages, a great deal that would interest every one, and from which the inferential lessons of artistic growth and development, which the author has apparently carefully avoided, may be gathered by those who see in brick something more than a merely constructive material. Only in comparing the tile manufacturers of to-day, does the author draw out any of the causes of success or failure. Bostonians are inclined to pride themselves on the success of the Chelsea Tile-Works and to sometimes congratulatingly assure themselves that such artistic triumphs could have been possible only under the æsthetic influences and appreciation which are peculiarly Bostonese. But our author recalls the fact that Mr. Low was an artist before the Chelsea Tile-Works was thought of, having studied several years in the ateliers of Couture and Troujon, and that upon such a foundation he added a long experience as a potter, so that when his peculiar ideas began to assume a marketable form, they were the product of neither an irrational enthusiast nor a mechanical, commerce-serving tradesman, but of a practically artistic manufacturer, who was able to bring about and maintain the nice balance between artistic inspiration and mechanical execution so essential to all work of this character. The author fails to make the obvious application in this case as regards brick and terra-cotta; namely, that if our best brickwork is still only slightly above the commonplace and most of our terra-cotta patterned after the absurd American Gothic style of fifteen or twenty years ago, it is because the manufacturers, though often the best of mechanics, have never availed themselves of opportunities for such artistic training as the Lows have found so valuable as well as remunerative.

This must not, however, be construed as a condemnation of the

[1] "*A Theoretical and Practical Treatise on the Strength of Beams and Columns*," by Robert H. Cousins, C. E. New York and London: F. & F. N. Spon.

[2] "*Practical Blacksmithing*," by M. T. Richardson, editor of *The Blacksmith and Wheelright*. New York: Published by the author.

[3] "*A Practical Treatise on the Manufacture of Bricks, Tiles, Terra-cotta*, etc., including bricks, drain-pipe, fire-clays, terra-cotta, tiles, etc.; comprising every important product of clay employed in architecture, engineering, the blast-furnace, for retorts, etc., with a history of the actual processes of handling, shaping, burning, enamelling, etc., with descriptions of machines, tools, kilns, etc.," by Charles Thomas Davis. Second Edition, thoroughly revised, with 217 engravings. Philadelphia: Henry Carey Baird & Co. Price, $5.00 post-paid to any part of the world.

book in question. It contains a mass of valuable information, well-arranged, thoroughly cross-indexed and fully illustrated, which should be of interest to every one who has had the slightest acquaintance with the subject, while the exact technical details of the various manufactures would be of value to practical workers in clay.

IF a French student of architecture ever buys a book for himself — and the students we have been brought into contact with have been much like American students, that is, believers in the supremacy of the divine afflatus which inspires their own supposed genius — it is pretty sure to be a copy of "*Vignole*," second-hand and mutilated it may be, but still serviceable, and this he thumbs and mulls over until, at least, he has passed the entrance examination for the Ecole des Beaux-Arts. Once admitted to the School he disregards more and more the lessons he has memorized, tries experiments of his own, invents new combinations, but through all his changes and novelties there is a mental or an actual reference to his guiding friend and chosen adviser, "*Vignole*."

It was a useful work that the great Italian architect Giacomo Barozzi, of Vignola, undertook in his youth when he measured the monuments of antiquity still left in Rome and reduced his results to a system of rules which have practically controlled the use of the five orders of architecture from the sixteenth century to our own day. Many editions of his famous work have been published, and in public and private libraries the cumbersome folio edition is no rarity, but it is so unwieldly that in the same library is often found the cheap French lithographed edition, the smaller size of which makes it a more serviceable assistant that its more handsome neighbor. But even this is too large for constant use, and architects who, owing to the frequent changes in architectural fashion, grow rusty as to the number of members in a Corinthian architrave and doubt whether the dentil-course comes above or below the modillions would be glad to have a smaller book that can lie on the corner of a drawing-board within easy reach, while it does not cover up the work or get in the way of the constantly shifting triangle.

Such a smaller edition has at length appeared in the shape of a reprint and translation of the edition of 1832 (an edition which is said to be one of the finest that has ever been issued), and the very moderate price at which it is sold should cause every one to add one or more copies to his office library. This little work does not profess to contain all the plates of the original, and the translation is rather a condensed paraphrasing than a literal version, but it is all the more useful for preserving the kernel while rejecting the husk.

The plates are excellently reproduced and the measurements in spite of their occasional minuteness are quite legible. It is rather a pity, that while the translators were at work some one did not suggest to them that they might materially add to the value of their book by incorporating in it a corresponding series of plates, giving the composition and measurements of the Greek orders.

SOCIETIES

THE T-SQUARE CLUB OF PHILADELPHIA.

A REGULAR meeting of the T-Square Club was held at the office of Brown & Day, architects, on Wednesday evening, December 4.

The subject of the evening's competition was "A Music Pavilion in a Park," to seat thirty musicians. Plan and perspective required. Drawings were contributed by Messrs. Hayes, Jamieson and Noland, whose sketches won first, second and third mention respectively, and Yarnall, Hickman, Bancroft, Milligan, Keen, Brooke and Dacey.

The following new members have been admitted to membership since the last regular meeting: George Nattress, Frances W. Caldwell, John Hall Rankin, Eugene Sansom, Crawford Coates, H. Peale, Jr., William Loyd Titus, Arthur Cochran, and W. D. Goforth.

The subject of the next competition is "A Design for a Finish to the City-hall Tower." Required a perspective view from the street.

LOUIS C. HICKMAN, *President.*
G. C. PARMENTER, *Secretary.*

THE ROCHESTER ARCHITECTURAL SKETCH-CLUB.

THE Rochester Architectural Sketch-Club, which now consists of fourteen members, held its annual election of officers, October 7, with the following result: *President*, Claude F. Bragdon; *Vice-President*, William H. Barnes; *Secretary and Treasurer*, E. S. Gordon, 50 Trust Building. In the November competition of a "Metal standard for a Piano-lamp," the first place was given to C. F. Bragdon, second place, E. S. Gordon, second second place, F. H. Beach, Jr., third place, W. M. Perrin.

"*The Five Orders of Architecture.*" By Giacomo Barozzi of Vignola. Translated by Tommaso Juglaris and Warren Locke. Boston, 1889. Price, $1.00.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

LESSONS FROM THE BOSTON FIRE.

BOSTON, MASS., December 12, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — Lest the adoption of safer methods of construction should be retarded by erroneous statements, you may, perhaps, permit me to correct some wrong impressions which you have given in your editorial comments upon the buildings that were destroyed in the recent fire in Boston.

In your paper of December 7th you refer to the Ames Building, planned and erected by the late H. H. Richardson, which stood on the curve made by the junction of Bedford and Kingston Streets, opposite the building in which this destructive fire originated, as "*an excellent example of the slow-burning method of construction.*" You then remark upon the rapid destruction of this building by fire in such a way as to throw a doubt on the merits of the so-called slow-burning method.

My own judgment is that it would have mattered very little how the Ames Building had been constructed so long as the very large windows, unguarded by any fire-shutters, were exposed to the fire on the opposite side of the narrow street. Had it been constructed wholly of brick and iron exposed to heat in what is commonly called a fireproof method, and yet been filled with the ordinary quantity of combustible merchandise, I have no doubt it would have been as completely and speedily destroyed as it was under the actual conditions. The destruction of this building, as I am informed, began with the iron roof.

I beg to say that, in the judgment of those with whom the so-called slow-burning method of factory-construction originated [not myself, but my predecessors and coadjutors], this building was so far from being "an excellent example of slow-burning construction" as not to have been any sort of an example. Mr. Richardson himself would, I think, have been the last man to sustain your description.

I confess that when such inaccurate statements are made in a journal assuming to represent the profession of architecture, they may lead those whose business it is to try to prevent loss by fire to become almost hopeless of any effective support from the profession.

The single element in this building which was taken from the plans of those whose business it is to construct slow-burning factories was the so-called "factory-floor," consisting of plank and boards laid solid over heavy beams set wide apart, without any ceiling or sheathing underneath. There were two thicknesses of asbestos paper between the upper and under floors, but, as asbestos is a pretty good conductor of heat, and since asbestos paper is not a good waterproof material, we do not advocate its use in factories except for the purpose of preventing dust from passing through the cracks. As a fire retardent it has very little efficacy.

Mr. Richardson adopted this floor:

1. On its merits as a floor, and not as a fire-stop.

2. Because he approved it as an artist, and considered it more consistent with the specific design of this particular building than the ordinary floor laid on joist or plank, one or two feet on centres, plastered underneath.

Aside from this floor, the construction of the stairways and the stair partitions; the shape, size and disposition of the windows; the lack of protective apparatus and the want of any provision for approach to the building in the rear or upon the roof; and yet, more than all else, the shape, material, covering, construction of dormer windows and every other element of the roof, were utterly inconsistent with the very elementary conceptions of slow-burning construction.

In reference to the roof, I am informed by those who observed the progress of the fire that at a very early period the expansion of the iron forced the upper part of the wall outward, and threw it, with the dormer windows, into the street. The remainder of this iron roof then crashed downward through the building before any flames were observed in any of the lower parts. This observation has since been sustained by the officers of the Fire-Department.

I can, perhaps, make this case more plain by treating the problem of placing a slow-burning commercial building upon a lot corresponding in shape, size and surroundings to the lot upon which the Ames Building was erected. I will change the conditions only by assuming that the lower story of the proposed building is to be used for a show-window in a retail shop, and will also change the location so as to submit the possible conditions of surrounding buildings as they might be found.

We may suppose that there is a vacant lot of triangular shape on a curved junction of Washington Street and some other street, upon which a building of triangular shape, rounded on the front, is to be placed. We will assume that all the light is to be taken from the front on this curve, that there can be no windows on the other two sides of the triangle, and that there is no room for easy access or for

light at the junction of the two sides of the triangle in the rear. The owner gives the following instructions to his architect:

"You are requested to make a plan and elevation for a building to be put on this lot, which shall be suitable, safe and not of unusual cost. The rent which can be obtained will not warrant the excess of cost for a strictly fireproof structure; it is to be built on the slow-burning principle, and is to be guarded according to the method of factory-construction, consistently with the rules of that system."

We will next assume that the architect first views the surroundings in order to determine what dangers may be incurred from buildings standing near. It might happen that he would find a large building on the other side of a narrow street, of which the front rests on square iron posts. These posts are supported in the basement upon granite columns of about the same size. Upon these posts, which are over twenty feet apart on centres, rest girders of cast-iron, making open spaces for show-windows eighteen feet in the clear. Above the first story he finds four or five stories of granite or brick resting in part upon the posts, but in greater measure upon the cast-iron girders. He finds that the floors within this building are also supported on cast-iron posts, of which he does not consider the off-sets sufficient to give a suitable rest for the ends of the beams. He also finds that the floor-joist extending from the first line of posts toward the wall are over twenty-five feet in length, and that the outer ends rest upon the same cast-iron girders by which the granite or brick walls are sustained. He makes a rough-and-ready computation, and he finds that if these floors are loaded with the average weight of merchandise, each cast-iron girder will be called upon to sustain a weight of nearly one hundred tons, or of about ten thousand pounds, to the running foot, mostly the weight of the wall. This architect, being familiar with the treacherous nature of heavy iron castings and with the yet more treacherous nature of both cast-iron and granite when exposed to fire, reasons to himself somewhat in the following way: "If a fire ever occurs in that basement, the vent for the heat will be at the basement windows, just above the level of the sidewalk, where the square iron posts rest on the granite blocks. The firemen will be unable to protect these blocks; the corners of the granite will, therefore, be very quickly converted into sand by the heat, and perhaps in thirty to sixty minutes the top of these granite blocks, which are less than two feet square, will be rounded off so as to no longer give a sufficient support to the square iron posts which rest upon them." Again he may say to himself: "If the fire occurs on the first floor, that cast-iron girder will surely be cracked, bent or broken in a very short time." Or he may again say: "If any of these inside posts give way, or if the beams which are insufficiently supported drop from the posts, the construction is so badly devised that each post and each girder will probably prove to be a key on which the stability of the whole structure depends; if any one gives way the whole building may come down at once."

He next estimates the direction of the forces which will be in action in case of such a mishap, and he then says to himself: "Within thirty to sixty minutes after a fire gets well underway in that building those walls will be pushed outward; they will fall completely across the narrow street; they will then block the street. After that there will be no possible approach for the firemen on the front to the building which I am to construct. It must then take its chance without the service of the fire-department, unless it can be guarded within or approached either by way of the roof or at the point of the rear angle from the other buildings alongside or behind it." The building opposite the Ames Building fell in this way, as I am informed and as I had reason to suppose it would, if a considerable fire occurred in it.

Perhaps the architect advises with the fire-engineers, and, if they have confidence in him, they may tell him that they look upon this building with such distrust and dread that they will neither order their men to enter it nor to attempt to cope with a fire in it except from a safe distance.

Having thus informed himself of the conditions to which he must adapt the construction of the building ordered so that it may be made suitable and safe at a moderate cost, the architect then proceeds to make his plans, and not before. His necessary conclusions are as follows:

1. Nothing but brick can be safely made use of for the outer wall of this building. Fire-brick of the same size as common brick, bonded into the wall of which they form the face, preferred to any other kind.

2. Unless the windows are so constructed as to disclose the least amount of wood on the outside, and unless they are guarded within by suitable fire-shutters so as to keep fire out of the building, it will be destroyed by the combustion of the contents, of whatever material it may be constructed, when the opposite building burns.

3. Since the spaces in the lower story must be large enough for show-windows, they cannot be guarded by shutters; an outside fire must therefore be cut off inside the show-case, of which the windows make the front.

4. The roof must be flat or nearly so; it must be guarded by parapets especially on the front; it must be fitted with roof hydrants from which heavy streams of water can be thrown upon neighboring buildings.

These points being decided, the true methods of slow-burning construction may then be adopted as follows:

1. The beams to be of heavy timber, set wide apart, either solid or in two parts bolted together with a space for ventilation between; the main floor of three-inch plank grooved and splined; next a coat of cement-mortar over which the top floor is to be laid. In place of the cement-mortar, two thicknesses of paper or sheathing-felt with asphalt between may be laid between the plank and the top floor. If either mortar or asphalt paper are thus placed, the centre lines of the plank should be indicated so that the nailing of the top floor may be on that centre, to prevent any effect upon the nailing from the swelling or shrinking of the plank.

2. The elevator is to be in a fireproof shaft at the left on the front side, surmounted by a thin glass skylight and fitted with fire-doors made of two thicknesses of wood encased in tin, automatic in their action. Wire netting is to be placed under the glass.

3. The stairway may be on the other side; it must be encased in brick; the doorways protected by fire-doors surmounted by a sky-light glazed with very thin glass, with wire netting underneath; the stairway carried to the roof.

4. There must be no opening from one story to another except by way of the elevator, the stairway, or by the pipe-chamber in the rear to be hereafter described.

5. If the utmost security can be afforded, the underside of each floor may be plastered with rough plastering on wire-lathing following the line of floor and beam. This plaster must have no skim-coat on it, lest the air should be excluded from the heavy beams, and they should therefore be exposed to the fermentation which is commonly called dry-rot. If it is necessary that the ceilings should be sheathed rather than plastered, the sheathing shouldly be nailed solidly on the underside of the plank. The walls of such buildings should not be furred; if plastered, the plaster should be put directly upon the brickwork. If it is necessary to sheathe walls in the lower stories or in show-rooms, the space between the furring-strips should be plastered, and the sheathing should be nailed close against the plastering. This sheathing may be painted but should not be varnished with the ordinary combustible varnishes.

6. As the show-window is to be used for the display of goods, no light is required from it; it is therefore to be backed by a brick wall four or five feet within the building, and ceiled overhead with fireproof material; to be entered by a suitable fire-door from the entrance porch inside the outer door, and outside the inner fire-door of the building proper, which is to be closed at night. This show-case may be stopped with incombustible material below the ceiling of a high story, so that some light may be taken from shutter-guarded windows.

7. Above the first story, wall-spaces and window-spaces must be equal so that every window may be fitted with an automatic fire-shutter placed on trolley tracks, held open by fusible links which will yield to the heat of a fire passing through the glass of the windows before the glass is broken, so as to assure the automatic closing of the fire-shutters when not closed by hand.

8. In the rear angle, behind a suitable fire-wall, all of the heating-pipes, drain-pipes, electric-wires, and the water-pipe from the roof are to be placed in a shaft.

9. Room may be given within this shaft for a fire-escape, or one may be placed outside communicating either with a subway to the street or with some other building, if there is no other means of access to the rear. From this rear shaft access may be had to the roofs of adjoining buildings; or the firemen may obtain access to this building from such roofs, as well as to the roof itself.

10. The roof is to be constructed like the floor, of thick plank, preferably covered with copper, pitched slightly to the rear so that the rain-water will drain off through the water-pipe, which being placed next the heating-pipes inside the building will not be liable to become clogged by freezing. This roof is to be surrounded with parapets, and furnished as above stated, with roof hydrants connected either with the high service; or, if the building is large enough, to be served by a powerful steam-pump in the building itself. If possible, this pump should draw water from a well or reservoir unless the city water-supply and pipes are very large.

11. Asbestos paper or felt is not accepted as the equivalent of cement-mortar or asphalt paper because it is neither a good defence against water nor heat; asbestos being merely an incombustible material which partially serves as a non-conductor of heat when in a loose and fluffy condition holding entrapped air; but which, when compact, is a rather good conductor, being quickly heated red if exposed to a moderate fire; as air passes through the interstices of asbestos, wood may be much more surely protected from heat with tin than with this material, yet better with plastering on dove-tail lath or on wire-lathing.

12. Such being the necessary conditions, the artistic skill of the architect must be limited to the color and disposition of the brick, to the use of terra-cotta, and to the decoration which may be put upon flat surfaces in the treatment of the interior, without painting the heavy beams or making use of combustible varnish of any kind upon the woodwork.

13. The tops of the windows must of necessity be square, because the round-top window gives the least light at the most important point; the top of the square window being carried up flush with the ceiling of each room in order that the top light may be most fully distributed within.

14. Heavy wooden posts may be made use of, preferably square posts of large size. Iron posts may be adopted under the following conditions: if an iron column or pier is used in the external wall it should either be filled-in with hard brick and be of sufficient size to hold a brick pier capable of sustaining the load; or the iron post should be made double, the inner column calculated to carry the full load; the space between the inner and outer column filled-in with at least one inch of plaster-of-Paris; or else some of the composite columns may be used in which the iron is strong enough to sustain the whole load, protected on the outside with incombustible material of a suitable kind.

15. If it is desired to give absolute stability to the front wall so that it may, perhaps, stand unimpaired even if a fire within the building should get through the floors, a line of posts may be placed four or five feet away from the window, upon the wall by which the show-window is backed. Between each line of posts and the wall itself, an alleyway may be constructed, with the floor so framed as to become a horizontal truss, entirely separate from the remainder of the floor; these posts and

this alleyway, being made nearly fireproof, would become an inner buttress sustaining the wall on a base equal to that of the wall and the width of this alley, at whatever width may be determined. The floor within might then fall away from these posts without straining either the trusses, the posts or the wall itself.

16. Given access to this building from above or from the rear through adjacent buildings, firemen could safely enter it, and being guarded from the heat by the shutters, as the workmen in the Tebbitts Factory, in Lynn, were guarded, they could fight the heat coming through the cracks from the fire opposite; they could also operate upon the fire from the roof or through port-holes which are sometimes constructed in cotton storehouses for the purpose of putting the end of a hose-pipe in or out, without exposing the firemen to any considerable amount of hazard. Such a building as this, placed opposite a dangerous building, would thus become a safeguard to the neighborhood in place of being an additional menace, and from it the stone and marble shams which screen but do not protect so many cellular wooden structures within the limits of the City of Boston and elsewhere might be protected from above, if any such were near.

The problem of guarding very large windows in lower stories without putting a brick wall behind them a few feet distant, is one so foreign to mill-practice that I hesitate to consider it. In narrow streets the necessity for light or the requirements of trade may make it incumbent upon owners to insist upon such windows being incorporated in the plan.

The only theoretic solution which the writer can offer is as follows:

1. To guard the windows with rolling-shutters made of steel slats, so thin as not to be liable to warp: such shutters would probably exclude flame and sparks in some measure. Behind these shutters heavy blankets might be kept upon permanent rollers. Such blankets having been treated with antiseptic and fire-retardent materials could be kept free of moths, and if wet by the sprinklers would be a very great safeguard.

2. To place one line of automatic sprinklers back of these shutters, and so adjusted as to throw a heavy shower of water upon them, the rest of the floor being protected with automatic sprinklers of the common kind.

3. To permit no passage from such lower floor to the upper floors to exist, unguarded by fire-walls at the stairways and elevator-shafts all doorways guarded by suitable fire-doors.

I have thus attempted to give a description of a complete slow-burning building so placed as to be exposed to exceptionally dangerous conditions. On a different lot on a wide street, accessible both in front and in the rear, the extreme precautions named in the foregoing description might, in part, be omitted. Unguarded windows might perhaps be tolerated, although they are never safe if there are combustible buildings, and especially very high buildings, near by.

The advantage of the floor-construction, as compared with the ordinary joist and ceiled floor is, that there are no cavities in which rats and mice may build their nests of materials which are subject to spontaneous combustion; also because there is no serious obstruction on such a ceiling to the clean sweep of water thrown by the hose-pipes between the timbers. Also that it is slow to ignite and slower to burn.

I have only described what is the common practice in the construction of every cotton or woollen factory, paper-mill, machine-shop, or other building which comes under the supervision of those whose business it is to prevent loss by fire.

The rules which I have laid down are consistent with the construction of a building of the customary size of modern cotton-mills, at a cost above foundations of from seventy to eighty cents per square foot of floor, or about four dollars per square foot of ground five floors high, about twelve feet each story above the foundation; automatic-shutters counted as extras. If this mode of construction is not superseded in city buildings by the cohesive arch or dome represented by the Guastavino Fireproof Construction Company, it may be worthy the attention of the owners of the commercial buildings which may be placed on the lots which have been cleared by the recent fire, or elsewhere.

By comparing these specifications with the conditions of that very beautiful work of art known as the Ames Building, you will, I think, justify me in calling upon you to revise your statement that that building might rightly have been considered "an excellent example of the slow-burning method of construction."

The question is often asked why many of the existing hazards of fire in the buildings which were constructed under the old Building Law, and also existing to some extent in buildings constructed under the present more complete Act, may not be avoided in future construction by amendments to these Acts.

There are amendments which perhaps ought to be made, of a somewhat general nature. More frequent fire-walls are required, both to sustain the outer walls of large buildings and to prevent the extension of fire within them; but too much reliance ought not to be placed on statute protection. Almost all the dangers of fire are due to a want of perception on the part of the owner or occupant of the necessary conditions to which he must subject himself unless he chooses to run the risk of the destruction of his property or the interruption of his business by fire. If such an owner elects to trust to a policy of insurance to compensate him in money when the fire occurs which he himself has caused by want of attention to the conditions of safety, then the safer method of construction may possess no interest to him, and he can only be prevented from endangering his neighbors by compulsion of law, or by such an appeal to his cupidity as may suffice to prove to him that no man of common sense, however penurious, can afford to place himself in such a position.

There are many architects who are now entitled to the name, men who are not only masters of design, but who also comprehend the art of building and the elements of engineering which are necessary in ordinary practice, and if owners and occupants did not insist on meretricious art; or were not captured, misled and humbugged by skilful designers who make more or less artistic pictures of elevations, but who have no comprehension of the art of building, then these true architects might have, or would have made Boston and other cities, a great deal safer than they are now.

Commercial buildings may be constructed consistently with the rules of safety, and even more suitably for the purposes for which they are used, at as low a cost, if not lower, than the sums which have been expended in the construction of the conspicuous examples of combustible architecture — like a large part of the buildings which now expose this city, and nearly every other, to the danger of a great conflagration.

The prices of typical factory buildings have been reduced to rules. He who proposes to build a factory, having estimated the cost of his foundation, may be absolutely certain that any plan submitted to him by architect or builder, which calls for an expenditure on a building of the average size, five stories high, of more than four dollars per foot of ground covered, or eighty cents per square foot of floor, ought to be rejected unless he is prepared to spend money unnecessarily.

The factory construction may be adapted to commercial warehouses, subject to such additional cost as may be necessary in order to finish the interior, to put up partitions, and to prepare the building for its commercial purpose. The load on the factory floor is a light one, and, therefore, each floor in the commercial building may require special computation with respect to strength. But there is an absolute basis of average cost for the factory building, which may be reduced considerably below the standard named, in many places; the variation being in the cost of brick, timber and labor. Eighty cents per square foot of floor may be considered the maximum cost of the most substantial factory, above the foundation, in this section of the country.

It would seem to the uninstructed mind that on such a basis of fully established cost in one class of buildings, the variations due to size and to difference in interior work might also be established in commercial warehouses, so that any intelligent owner of property would be himself fully capable of passing upon the plans and estimates submitted to him by architects and builders. It often appears to the uninstructed mind that the customary method is quite the reverse of this. It certainly is in respect to many buildings aside from commercial warehouses. Committees are very apt to give their attention at the beginning, mainly to the elevation and design of churches, hospitals, school-buildings, and the like, without much regard to the manner in which this outer shell is to be filled with the combustible material so as to be put to use. Perhaps, for this reason we burn one or two churches every week on the average — the destruction of those which are called stone churches being apt to be the most complete; also an average of two hospitals or asylums every month, with an occasional loss of life; and more than one hotel every day; while an occasional great conflagration, like that which occurred on Thanksgiving Day, brings up the average price of combustible architecture for the year 1889 to the level of preceding years — otherwise it might have been inferred that greater improvement has been made in the art of building in cities.

It is possible that an incident like this, which may be repeated at any moment not only in Boston but in many other cities, will lead to a more intelligent consideration of the purpose to which commercial buildings are to be put, and may possibly lead to a more adequate study of the dangers which may be incurred from bad and dangerous buildings already standing near vacant lots, before the architectural design of the buildings to be put upon the vacant lots is determined upon.

It is doubtless desirable that art should be a principal motive in architecture; but is not art misplaced when applied to such buildings as the Ames Building under the conditions of the surrounding neighborhood; was not Hunt's genius misapplied when he put his pictures upon the unstable walls of the Capitol at Albany?

There is a place for everything. The builders of factories have, to a certain extent, been obliged to treat their buildings without much assistance from the profession of architecture, because of the difficulty which has existed, until very recently, in persuading the architect that he must be something more than an artist, in order to be competent to construct either a factory or a commercial building.

EDWARD ATKINSON.

ENGINES AT THE BOSTON FIRE.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Allow me to notice, as a matter of abstract scientific interest, a detail which you quote from the received account of the late Boston fire. You say in your summary of December 14, "Solid streams of water from the hose turned into steam before they entered the windows." This is the account of eye-witnesses, repeated without question by the papers; but I believe it to be impossible, or at least to convey an impossible idea. The water must have left the nozzles with a velocity of eighty or a hundred feet a second. With

allowance for retardation, it would have taken about two seconds to reach its highest point, exposed perhaps for one second to intense heat. Now water absorbs heat rather slowly, and it is safe to believe that no heat to which it could be subjected could turn a solid cylinder of water some two inches in diameter into steam in one second, or in two. We all know, however, that the upward stream from an engine at the end of its flight is disintegrated by the resistance of the air, and especially by wind, into a coarse spray. It would be easy for spectators, too excited and untaught for accurate observation, to mistake this spray for steam. Undoubtedly in this form the water would be rapidly evaporated, but steam is invisible until it becomes wet, that is, practically condensed. If anything was seen that looked like steam, this is the best evidence that the water was then unevaporated. The effect of such an action as is ascribed to the fire would probably have been to drink up the spray as fast as it was formed, thinning down the stream to a thread which would disappear in a point. If a competent scientific observer should declare that he had seen the streams taper away like melting icicles and end in nothing before they reached the building, I should say that this was more natural, — but that the smoke had probably obscured his view. The discussion is rather abstract than practical, but it may help support our confidence in the fire-engines. L.

NOTES AND CLIPPINGS

The Amines Process of Sewage Treatment. — A demonstration of a new system of sewage treatment, known as the Amines process, has just been given at Wimbledon, England. The experimental term has been since July last, and the existing works in connection with the sewage farm have been utilized. Ordinary lime is slaked and passes through a mill, mixed with water and receiving at the same time a regulated stream of "herring brine." The special feature of the process is this brine. The sewage as received is fluxed with this mixture of milk of lime and herring brine in the proportion of three grains of brine and forty-seven of lime to the gallon of sewage. The sewage as treated is passed into a well and thence directly into one of the precipitating tanks. Of these there are six, all auxiliary, and each of a capacity of 85,000 gallons. From the tanks the effluent is run off into the river Wandle, and the sludge passes by gravitation into the filter-house, where compressed air is employed to pass it into the filter-presses. Of these there are three ranges. The cake as taken from the presses is almost inodorous, while the effluent is clear and inoffensive to sight and smell. The population of area treated is 25,000. It is claimed that while it takes three-quarters of an hour to fill a tank the sludge will be precipitated in half an hour, ready to pass to the filter-house. Mr. Ellice Clark, M. I. C. E., the chairman of the company, stated that while they were prepared to accept any income that might be recovered from the sale of cake for manure, they did not take that matter into consideration as affecting the cost of the process. The position they took was that sewage must be got rid of in the most effectual form, and they claimed to do this at a cost of one cent to one and one-half cent per 1,000 gallons. The claim in the prospectus that the effluent is completely sterilized by the addition of three grains of herring brine and seventy grains of lime to a gallon of sewage is a very remarkable one, and we shall look with interest for the results of further trials on this point. If it turns out that herring brine really has this marvellous effect, every herring caught in future should be pickled, for the demand for this material in domestic and municipal sanitation will be immense, and cess-pools need no longer be dangerous or offensive. — *The Times, Lowell, Mass.*

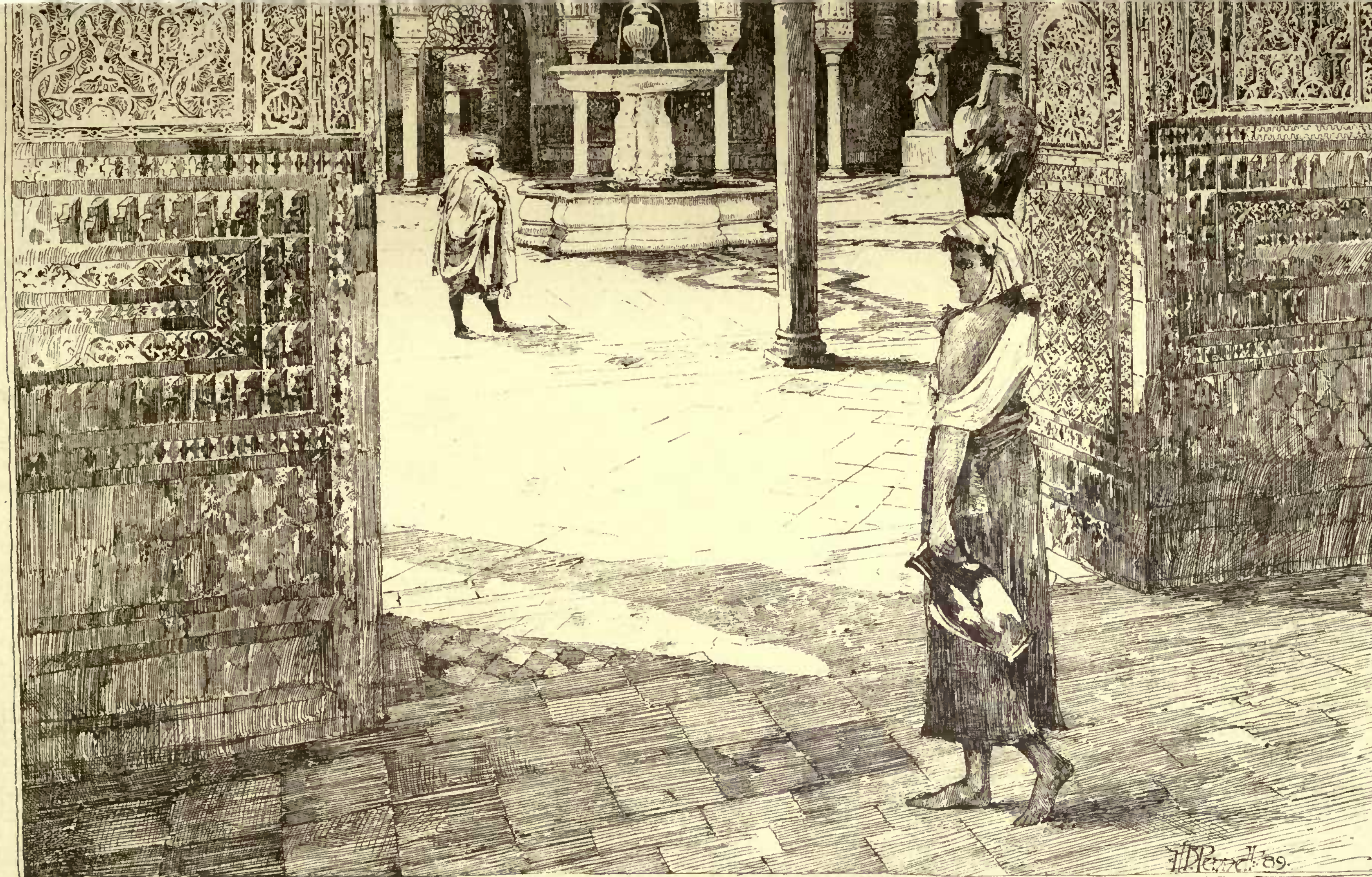
Oxide of Zinc. — "In the whole world there are about 150,000 tons of the oxide of zinc made. The principal method used in the making is called the Belgian process. The ore is ground to a fine powder, like sand, and mixed with pulverized coal, in the proportion of one-third coal to two-thirds ore, to one-fourth coal to four-fifths ore. The coal is to take up whatever oxygen is given out. This mixture is then shoveled into a retort, where, by means of a coke fire, it is heated until it becomes a vapor. A strong draught is caused by means of exhaust engines and the vapor is drawn into a large pipe. Just as it enters it meets a stream of fresh air, which causes it to burn with more heat. Then through this big pipe which receives the gas from hundreds of retorts it is carried for a long distance; finally cooled down to a moderate temperature, it is forced into a large room into bags, three or four feet in diameter and thirty feet deep, made of cloth. The gas escapes through the meshes, but the zinc oxide is left in the bags. In making the regular metal which is used so commonly, the same mixture of ore and coal is packed in cylindrical clay retorts, about four feet long and a foot in diameter. These are heated to a fearful heat and the metal runs slowly out into a kind of funnel which is fastened to one end of the retort. The metal from several retorts is collected until about two quarts is obtained, when it is cast in sheets." — *Professor Harper.*

TRADE SURVEYS

A recent estimate of projected railway construction for 1890 and 1891 puts the figures at about 30,000 miles. Much of this work has passed the preliminary surveying stage. The industrial boom that has spread over the country will probably stimulate railway construction, and the seven or eight thousand mile limit may be reached next year without difficulty. The announcements of new roads during the past three months go to show that a great deal of railroad building will be undertaken between now and next May. Besides the projected construction of roads ranging from fifty to two hundred miles in length, there are belt-lines passing through the preliminary stages, involving the outlay, according to two or three estimates, of seventy or eighty million dollars, and possibly one hundred million. Municipalities and county authorities in between thirty and forty States of the Union are contemplating liberal expenditures in the way of improved facilities for furnishing water, gas, electric-lights, cable-roads, public buildings and improvements of various kinds, all calling for large outlays of money and the placing of bonds upon the market. Agencies representing the bond-issuing interests speak very freely and encouragingly of the success attending the placing of this class of bonds, and of the prospects for placing the additional unloadings that are in contemplation. There will be an abundant opportunity for investment in this direction. It is learned by inquiry from parties representing foreign investors that much foreign capital is likely to be diverted into this direction, rather than into the buying up of well-paying manufacturing establishments and plants. Englishmen who have been endeavoring to invest money in this way complain that exorbitant prices are asked, and that negotiations in many instances have been abruptly terminated by naming prices which would not be named to any other purchasers. Most of these new bonds with which the country will be well supplied next year will pay six per cent, and will be bought at a discount. This policy may not be a wise one, but, whether it be wise or not, local authorities throughout the country intend to profit by the use of liberal loans. There is no good reason for apprehending any harmful results from this bond-creating business. Railway corporations are continually running into debt, and assuming heavier loads without a thought of untoward results. The newer sections of the country are filling up rapidly, and improvements above named are imperatively necessary. If they are not secured until the gradual accumulation of means will allow, then certainly must these municipalities and counties expect to remain in primitive conditions for a long time. The policy outlined is wise, and will be productive of excellent results. The purpose of referring to this money-borrowing crusade that is about setting in is to point out, in the first place, the opportunities which capital will have for earning good returns, and, in the second place, the necessity that will soon arise for the wisest possible financial or monetary system. These improvements will develop manufacturing interests and agriculture, and will bring into life a largely increased class of small and large traders, whose business it will be to effect the exchanges which the new army of wealth-producers will require. A column could be easily filled with announcements of important railway construction projected within the past three months. A very liberal estimate of the contemplated mileage would be 3,000 miles. A considerable proportion of this will be built in the South. One of the projected roads will extend from Kearney, Neb., to Galveston, Texas. A great deal of work is projected in Oregon and Washington. A dozen or more lines are to be built in Missouri and Kansas. In Arkansas, a 120-mile road will be begun within sixty days. Representatives of manufacturing establishments, electric-light companies, cable-road builders and iron and steel makers, who have been canvassing the country for business during the past two months, have been lately furnishing their employers and the public some very interesting information concerning the wonderful expansion of the country in every department of activity. The stories they tell of new work, and of extensions and of projections of a hundred kinds, are all very interesting to read and know. Their testimony, reduced to a few words, is simply this: that the producing capacity of the United States in all excepting a few lines will be fully taxed through the coming year. Among the exceptions which might be mentioned are the textile lines, but as to this there is doubt. Unsettled tariff duties put the woollen manufacturers at a disadvantage. A twenty per cent advance in cost of German hosiery, coupled with a great scarcity of foreign hosiery in the hands of American importers, is imparting a stimulus to the American hosiery manufacturing interests.

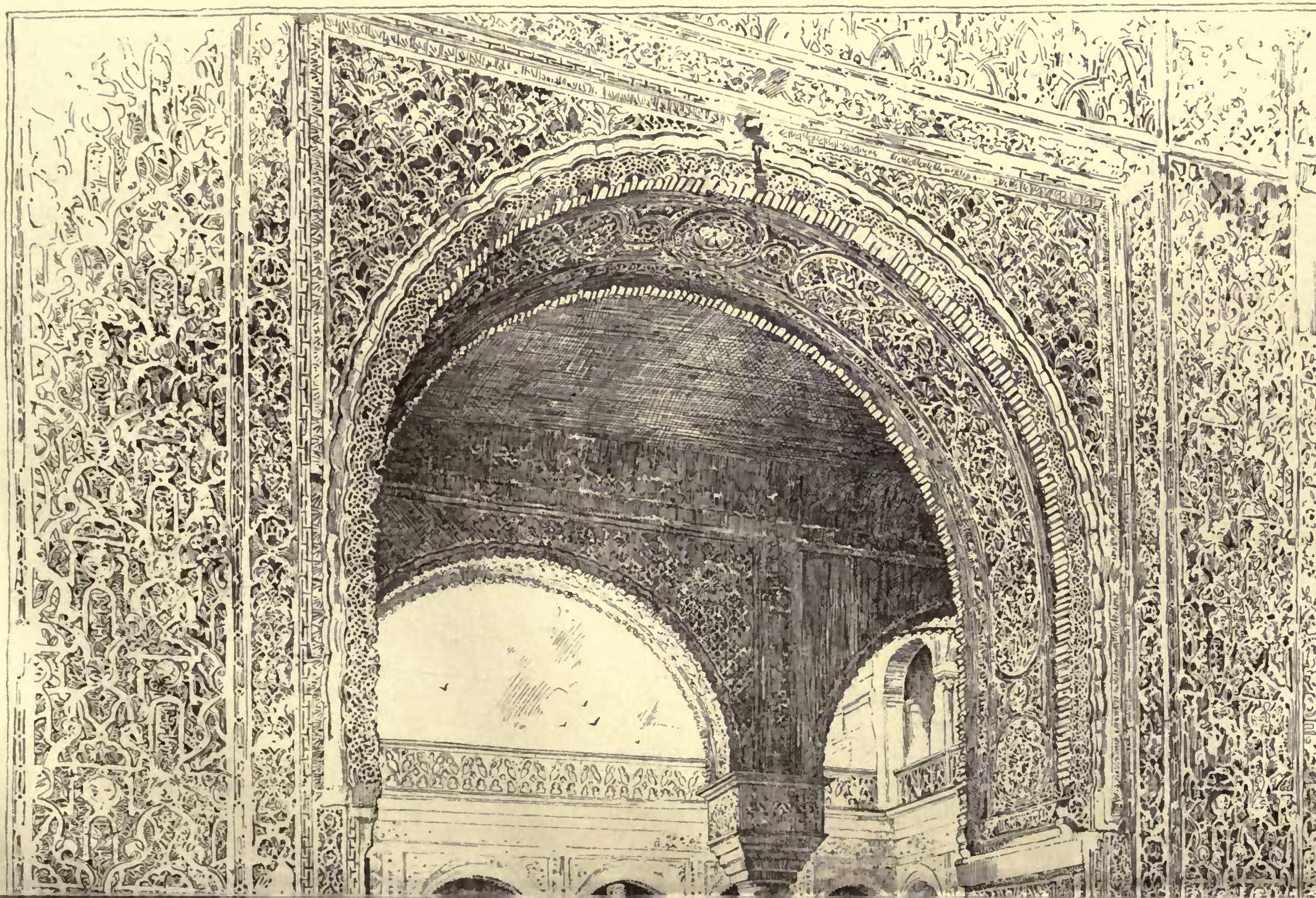
All kinds of cotton goods are selling at about the same price as last year, while cotton is a little higher; but there are signs of an advance in the commoner grades of cotton cloth. In the boot and shoe industry a strong and steady demand is keeping capacity pretty busy. In the clothing branch manufacturers are running to full capacity, but are obliged to watch the market very closely. The wool-using and wool-growing interests are not in harmony on the question of tariff duties. The dictators of our political policy recognize the urgent necessity of tariff reform, and a vigorous cutting down will be accomplished before the adjournment of Congress is reached. The iron trade is booming on both continents. In Germany prices are all "on the boom." Military and naval requirements are heavy. The most intense activity has been created, and the leading iron and steel works are full of orders for the greater part of next year. Such a prosperous condition of the iron trade as now exists in the United States was never known. Already, half the output of the Lake Superior mines for next year has been contracted for. From five to seven miles of coke cars leave the Connelsville region every day with coke. The bituminous coal-fields of the Allegheny Mountain region are crowded with orders, but competition is keeping prices down, and a grand soft-coal trust is now being contemplated for the purpose of increasing the price of coal 20 cents per ton. In the iron trade soft steel, Bessemer pig, nails and barbed-wire have all advanced. The present crude-iron production is over 170,000 tons per week, of which 118,000 tons is made in furnaces where bituminous coal and coke are used as fuel. Employers are somewhat concerned at the possibility of general labor strikes next year: First, on account of the improving trade conditions, and second, on account of the agitated question of an eight-hour day. Opinions differ very widely as to what effect the action of the federated trades will have upon labor in general. Striking is to be done in spots. Employers will scarcely know how to act in a coöperative way. The decision arrived at, and the reasons given for the decision, go to show that the movement is weak rather than strong. The Knights of Labor will not coöperate. The agitators have, by accident, chosen an opportune time for their demands, as in all probability the spring time of 1890 will be one of exceptional activity and promise. Furnaces and mills are blowing and roaring themselves hoarse; manufacturing establishments of all kinds are crowded with work to the verge of cheating Sunday out of some of its hours; railroad-managers are barely able to meet the exacting demands upon their facilities. Capital is stimulated to investment, and while margins are not large, risks are fewer and opportunities are more numerous. It would, therefore, seem that an organized attempt on the part of labor to demand an eight-hour day would have many things in its favor. The strongest point against the entire movement is the conservatism and common-sense, or more properly speaking, the *vis-inertia* of the great body of the American laboring people. The building trades will get the hardest blow; builders may find it advisable to yield the point in the larger cities for the time being, but equalizing influences will restore the equilibrium.

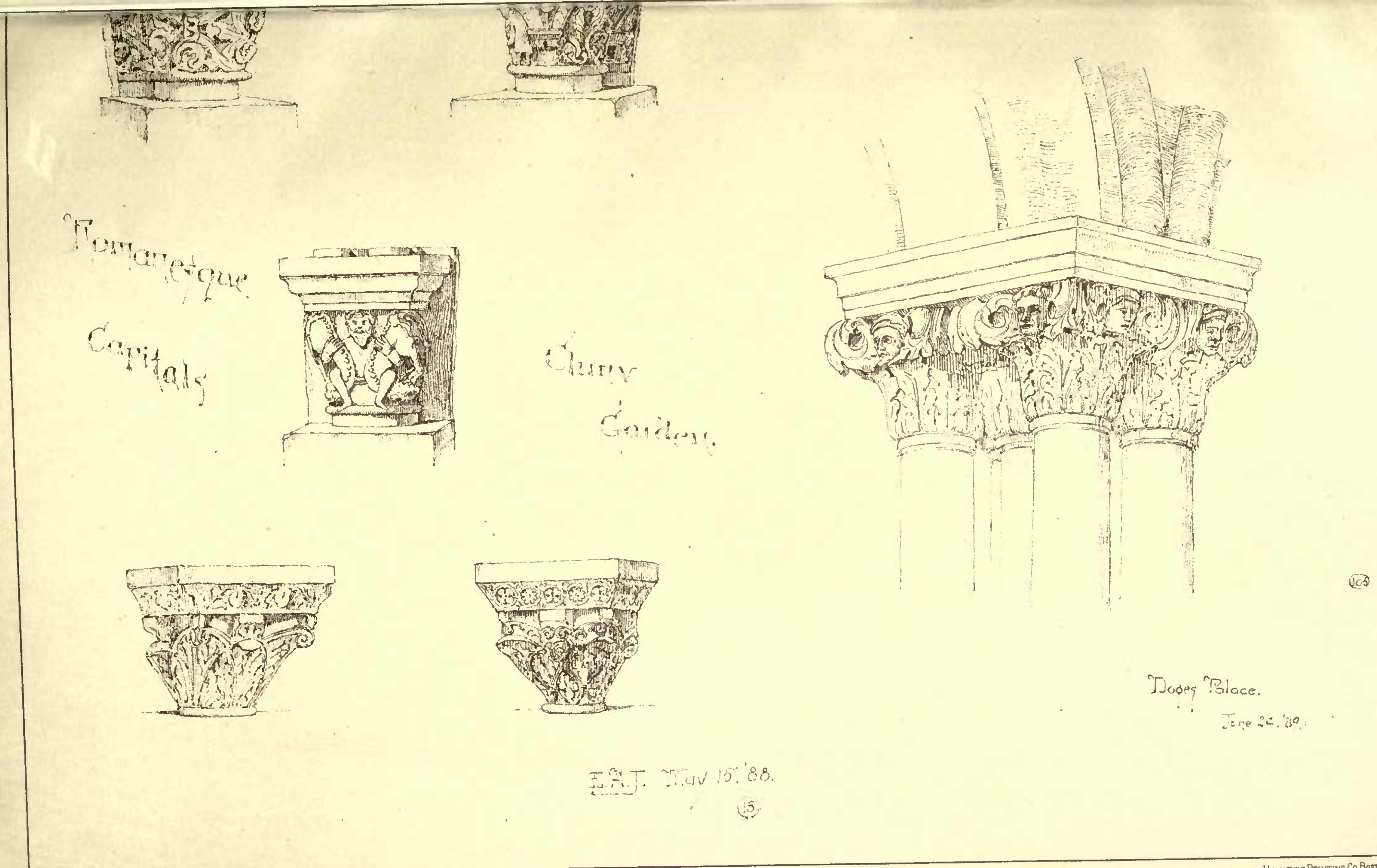
S. J. Parkhill & Co., Printers, Boston.



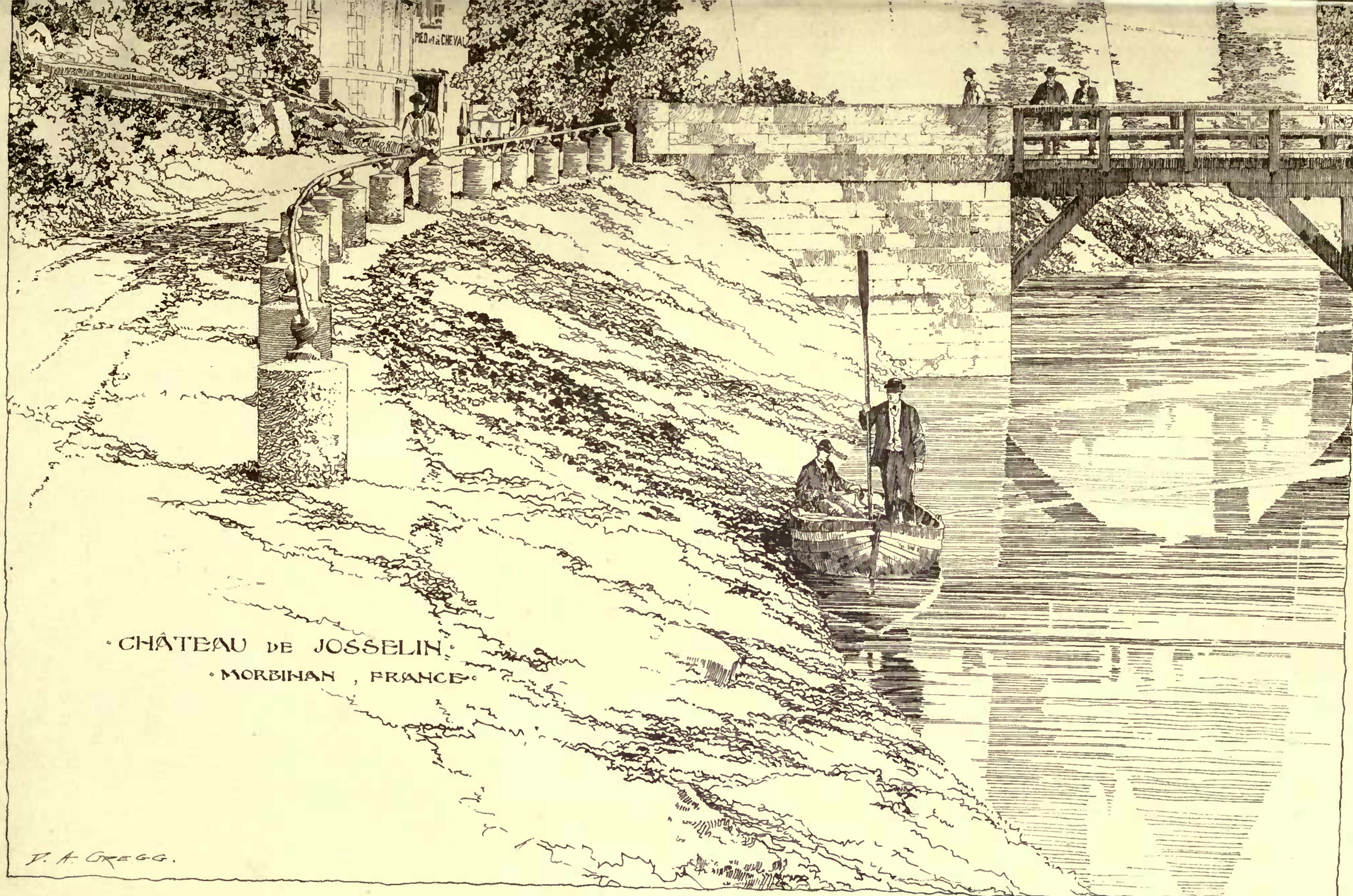
Heliotype Printing Co. Boston.

·CASA DE PILATOS, SEVILLE.
LOOKING INTO THE COURT-YARD THROUGH THE CHAPEL ENTRANCE·



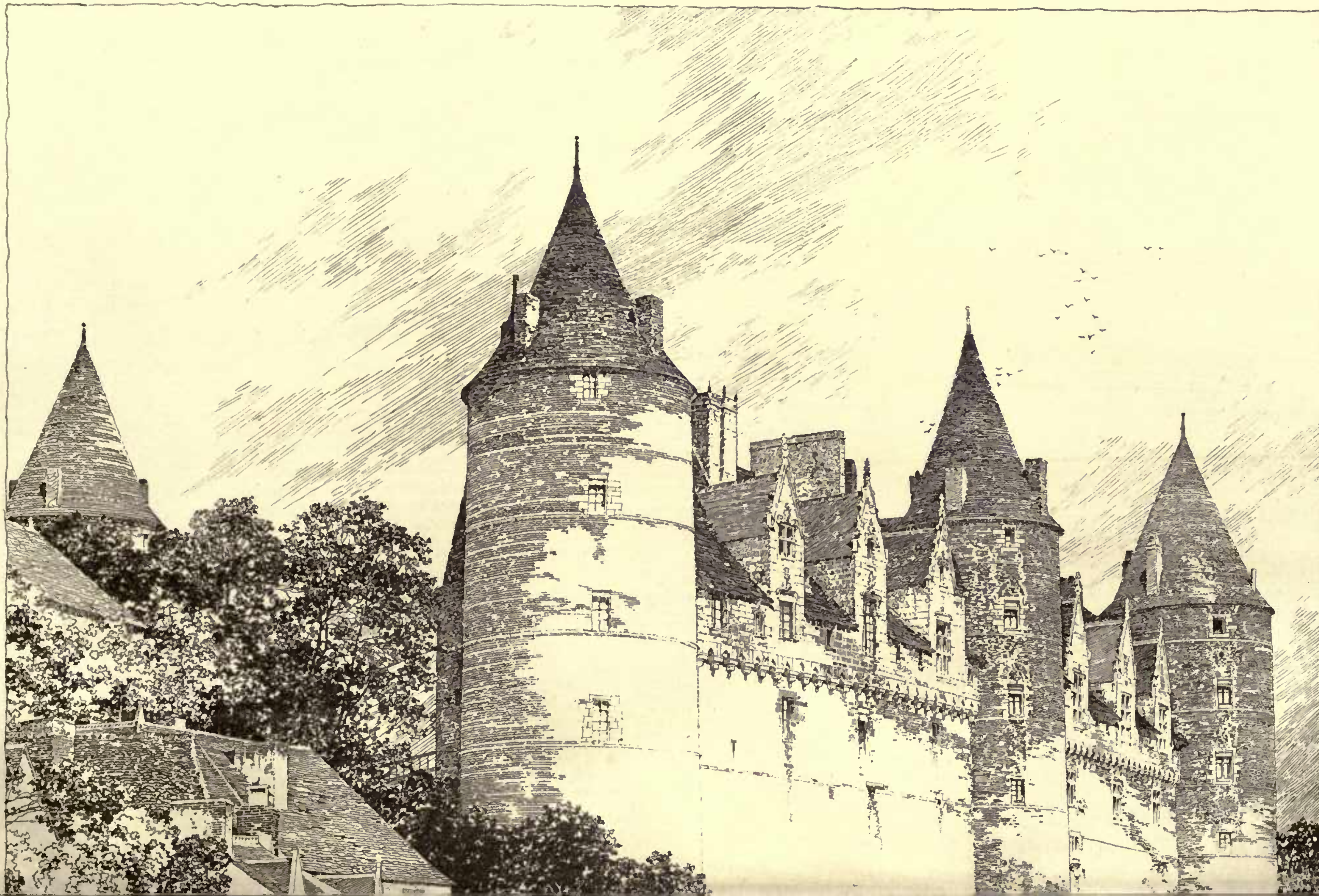


Heliotype Printing Co. Boston



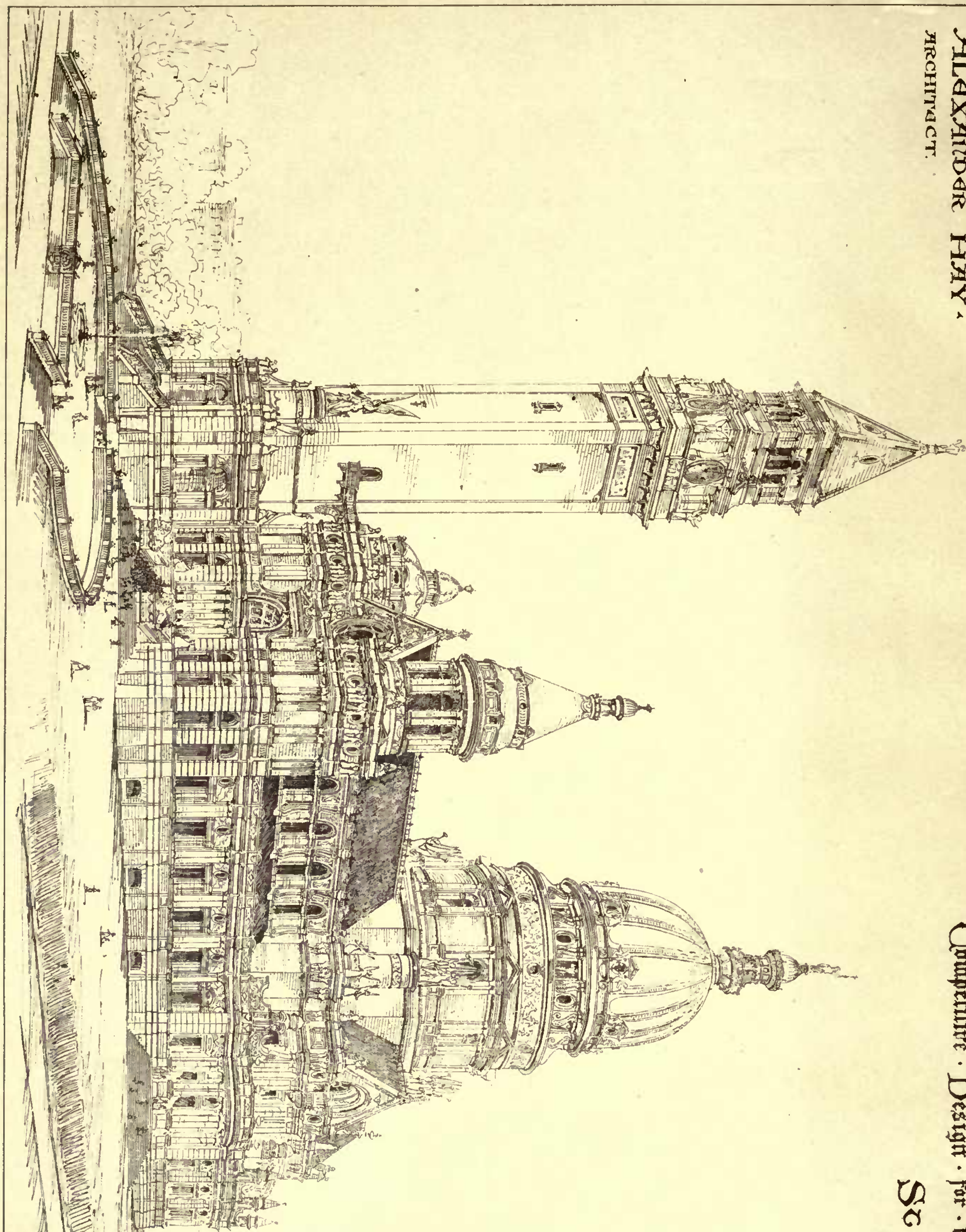
·CHÂTEAU DE JOSSELIN·
·MORBIHAN, FRANCE·

HELIOTYPE PRINTING CO. BOSTON

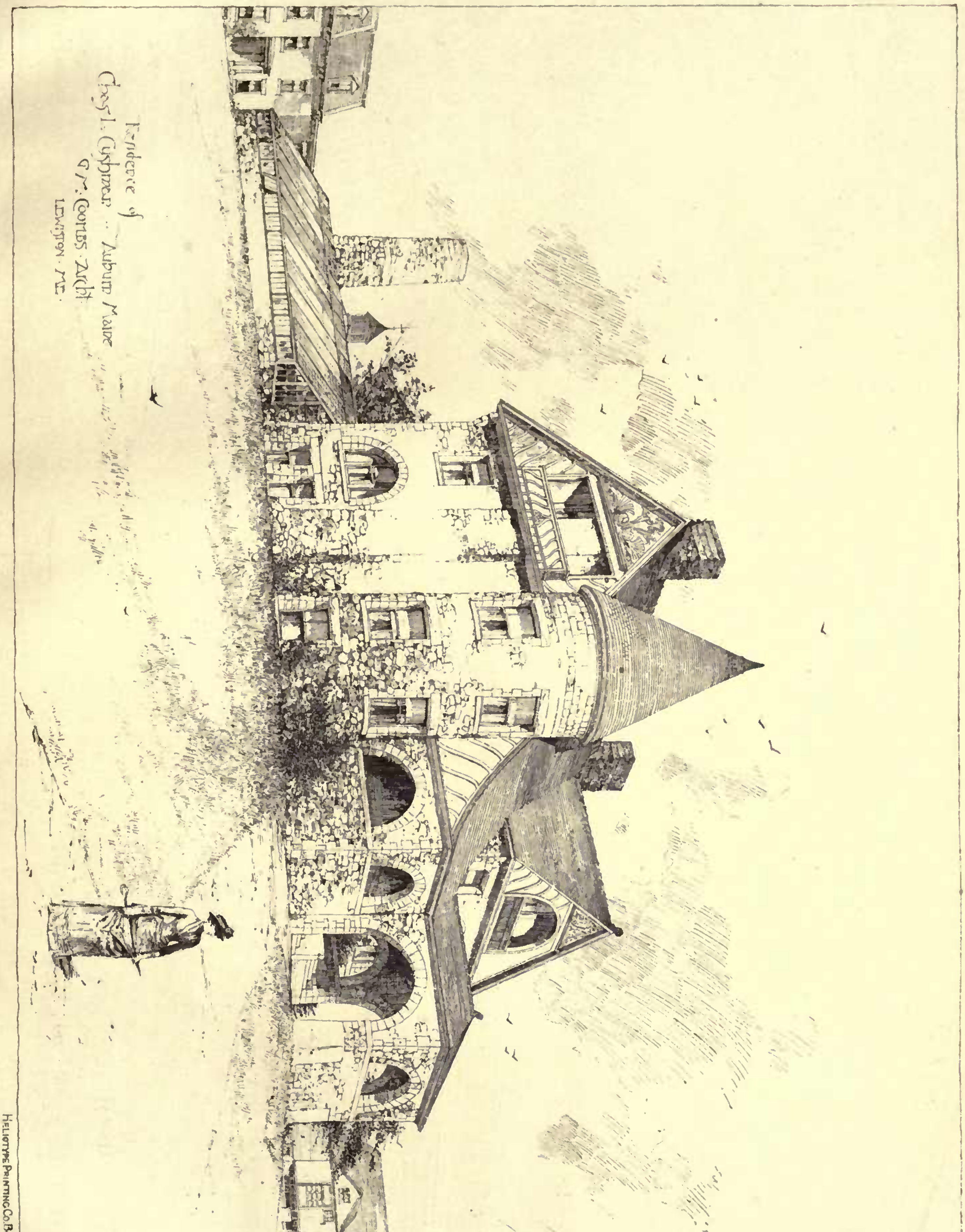


Alexander Hay, Architect.

Competitive Design for the Cathedral of St John the Divine New York.



Heliotype Printing Co. Boston

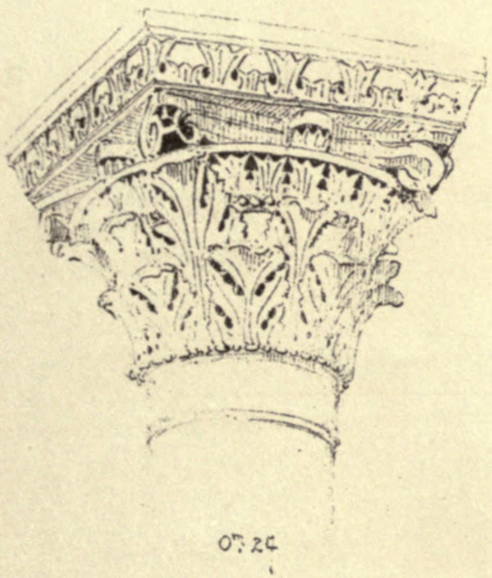

Residence of
Chas. L. Cushman :: Auburn Maine
G. M. Coombs Archt
Lewiston. Me.
Heliotype Printing Co. Boston.

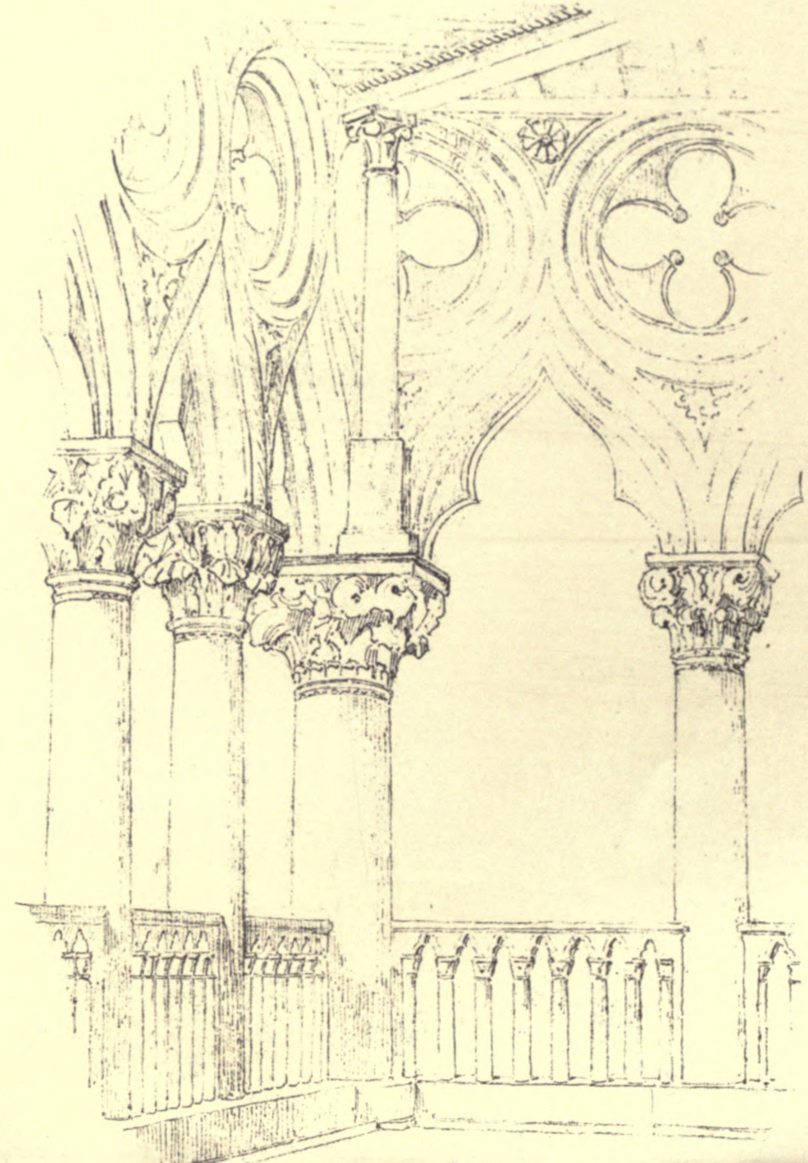


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American Architect and Building News, Dec. 21 1889.



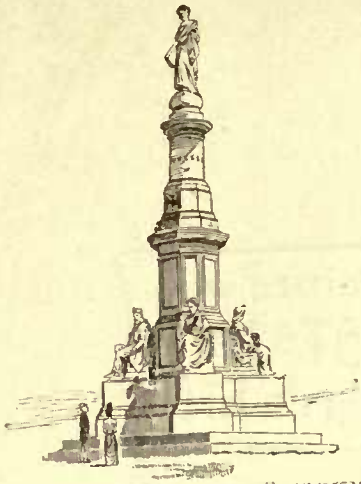




EAST END OF DINING ROOM IN THE HOUSE OF HON. WHITELAW REID, NEW YORK, N. Y.

McKIM, MEAD & WHITE, Architects.

HELIOTYPE PRINTING CO., BOSTON.

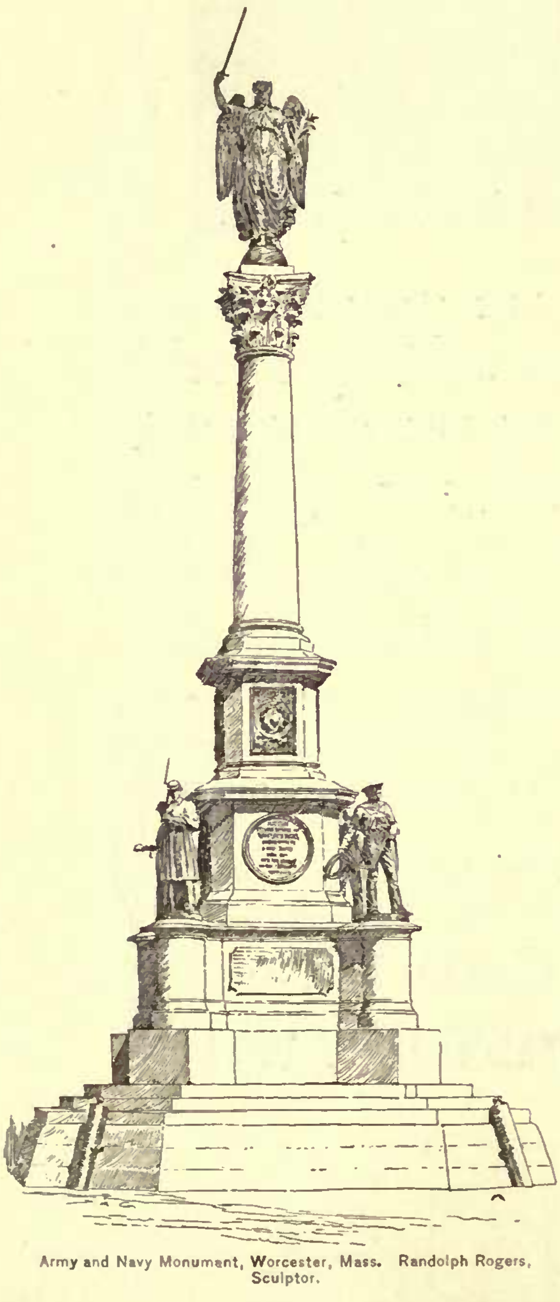


GETTYSBURG MONUMENT
DESIGNED BY J. G. BATTERSON

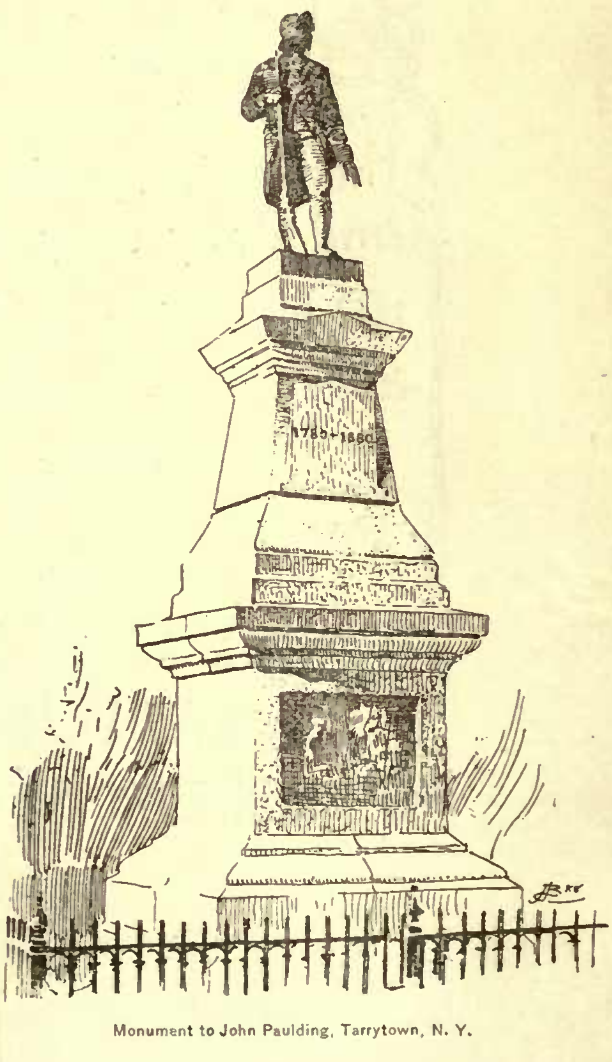


Martin Milmore, Sc.

Soldiers' Monument (bronze statue)
Forest Hills Cemetery : Mass:



Army and Navy Monument, Worcester, Mass. Randolph Rogers, Sculptor.



Monument to John Paulding, Tarrytown, N. Y.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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DECEMBER 28, 1889.

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MR. ORLANDO B. POTTER, who, since the disastrous fire in one of his buildings five or six years ago, has been quite prominent in matters of construction in New York, appeared the other day before the Board of Building Examiners in relation to the proposed amendments of the law, and made some suggestions, which were well received. He objected very strongly to the limitation of the height of all buildings to eighty feet, which has been proposed, saying that, if such a rule were enforced, the commercial supremacy of America would move elsewhere, and claimed that the slow-burning construction of wooden beams covered with plank, and plastered beneath on wire, should be permitted at heights greater than eighty feet, under the same conditions as one of iron beams and terra-cotta arches. He said that this was practically fireproof, while it cost only about ten per cent more than the ordinary inflammable construction, and he was seconded by the President of the Continental Fire Insurance Company, who testified that his company would write policies of insurance on such structures for one-third less than the rates now charged for ordinary mercantile buildings.

WE need not point out that, if all the underwriters would really follow the example of the President of the Continental Company, and insure mercantile buildings with their contents, at one-third less than the ordinary rates, on condition of their being built in a style which cost in the first instance only ten per cent more than the usual method, and was much less expensive to keep in repair, there would never be another mercantile building of the ordinary construction erected in New York. The whole question of building for mercantile purposes, as we have often pointed out, is purely a matter of dollars and cents. If a tenant can save in insurance an amount equal to ten per cent of his rent, on condition of occupying a building constructed in a certain way, he will gladly pay ten per cent more rent for a store built in this way than for one of the ordinary construction; and if owners can get ten per cent more rent for a slow-burning building than for one of the ordinary kind, besides saving in repairs and in their own insurance, they will build slow-burning ones, to the exclusion of the others. Of course, we do not look for any immediate reform of the kind, for two reasons. In the first place, we do not believe that the insurance companies will unite in any reduction of rates on slow-burning stores, either proportionate to the decrease in risk, or sufficient to make it an object to owners to erect them. The underwriters are perfectly aware of the fact that it is only by charging immoderately high rates on the good risks that they can meet competitive prices on the bad ones; so, instead of trying to encourage substantial building by reducing premiums on safe structures, which would compel them to raise their rates on unsafe ones, it has generally been their policy to keep the rates on good buildings so high, in proportion to those charged for bad ones, that there was no financial advantage in building solid structures, at the same time that they endeavored to make up for the lack of financial inducement, which they alone could supply, by pretending an immense moral zeal for sound construction, and, every time a fire occurred, by belaboring the architects, and moaning over the recklessness of mankind, and so on, to the disgust of all persons who knew enough about building investments to understand the comedy. In the second place, we doubt very seriously whether a store can be erected which will be really slow-burning, in the sense of a slow-burning cotton factory, for ten per cent more than the cost of an ordinary building. A cotton factory, with its average load of twenty-five or thirty pounds per square foot of floor, its small windows and brick piers, is a very different affair from a mercantile building, with floor-loads ten times as great, its plate-glass fronts and iron columns, and although it is perfectly easy to make the latter comparatively safe, it costs a good deal of money to do it. Without in the least disparaging the merits of the wooden girder and plank-floor and wire-lath construction, it seems to us that for city stores the use of iron protected by terra-cotta is greatly to be preferred, and if iron beams could be bought here at a reasonable price, it is this construction, proof against shrinkage and decay, as well as fire, that would soon prevail. We have before remarked that iron floor-beams of a given strength cost less in Belgium than hard-pine floor-beams of the same strength cost in New York. There is no reason why steel rails should be sold at our mills for a little more than a cent a pound, while steel beams, rolled in the same way, out of the same material, should cost more than twice as much, and if underwriters and others really wish to improve our building practice without doing anything themselves about it except talking, we will suggest to them that they leave the architects alone for a while, and devote themselves to the iron-beam combination.

A CASE was tried in a New Jersey Court the other day, where an architect sued for pay for his professional services. His claim was resisted on the ground that he had "agreed" to make plans for houses that should not exceed in cost four thousand dollars each, while, when estimates where made on the plans, the lowest exceeded that amount. The estimates were less than five thousand, and the architect altered the plans, so as to reduce the expense, but it appeared that the revised estimates were still somewhat over the four thousand, and his claim was dismissed with costs. Now, we need not say that it is very unlikely that any architect would really "agree" to make plans which it should not cost more than a certain sum to carry into execution. All that any reasonable person could promise or expect would be that plans should be made, the cost of executing which should be as near to the given sum as the architect's experience enabled him to judge, and if the lowest tender exceeded that sum, that the plans should be remodelled as might be necessary. Any architect who would agree to be bound any more strictly to a limit of cost than this would be a fool, ignorant of the circumstances which affect the cost of building, and unfit to be entrusted with the expenditure of money in construction; yet in most cases, as in this, the jury finds that the architect has bound himself to produce, in one, or, at most, two attempts, plans which any builder who happened to be at hand will immediately contract to execute at a price fixed beforehand, and the judge thereupon decides that, the architect having, according to the jury, contracted that the cost of executing his plans shall not exceed a certain amount, he is not entitled, either to any pay for making them, or to the privilege of remodelling them so as to bring the cost within the given sum. It is useless for an architect to protest that his client wanted his house to contain a given number of rooms, of a certain size, and that his plans were only preliminary attempts to reconcile the client's ideas of what he wished to get, and what he wanted to pay for it; if the jury can detect in the evidence the slightest suggestion that the owner named a sum to the architect as the cost which he proposed or desired for his building, it will always, so far as we have found, decide that it was the essential condition of the architect's employment that the estimates on his plans should not, on the first, or, at most, the second trial, exceed that sum, and that the orders, directions and requirements of the owner in regard to accommodation were intended simply as suggestions, the adoption of which by the architect was to be subject to the prime condition, that the limit of cost should not be surpassed. As

people's ideas of the house they want, and what they wish to spend on it, are usually incompatible, it is, therefore, very important to the architect to know which of the inconsistent requirements it is most prudent for him to follow, and all the cases show that he is safe only so long as he adheres to the limit of cost. If a man asks an architect to plan him a house with a given number of rooms, to cost "say ten thousand dollars," the architect may plan a structure of a less number of rooms, of the most inconvenient arrangement, and most repulsive appearance, but if it can be built for the sum named, he can get, at law, full pay for his work; while a man who included everything that the owner wanted in a most ingenious and beautiful plan, with a lovely exterior, cannot, according to many precedents, collect a penny for what he has done, if his client chooses to resist, and can show that the lowest estimate received from the local builders for carrying his design into execution was ten thousand one hundred dollars.

SOCIAL Science, as well as Engineering, has suffered a great loss in the death of M. Emile Müller, Past President of the French Society of Civil Engineers, Professor in the École Centrale des Arts et Manufactures, and in the École Spéciale d'Architecture, and member of a score of scientific, professional and beneficient societies. All our French journals speak of his death with great regret, but *Le Génie Civil*, of which he was the founder, and the President of the Council of Administration, devotes a large space to the memory of one of the most active, as well as the most benevolent men in France. M. Müller was born at Altkirch, in Alsace, 1823. His father was a lawyer, with a high reputation, belonging to a wealthy and distinguished family. When Emile was a child, the provincial tribunal was transferred from Altkirch to Mulhouse, and the lawyer was obliged to follow it. At Mulhouse, then in the infancy of its industrial importance, young Müller was greatly interested in the work about him, and was sent to the École Centrale in Paris, to prepare himself for the career of a manufacturer. He was a good scholar, and on graduating, by the advice of the great engineer, Polonceau, he entered the machine-shops of the Eastern Railway Company as an ordinary workman. Always sympathetic and intelligent, his sojourn among the men in the shops suggested to him all sorts of schemes for the amelioration of the lot of poor people, and he lost no time in beginning a series of efforts at carrying them out, which continued without interruption until his death. On leaving the railroad machine-shop, he returned to Mulhouse, where he devoted himself partly to business of various sorts, and partly to charity, designing and building school-houses, churches and public baths, at the same time that he was opening quarries and manufacturing lime. He soon became noted for his knowledge of the needs of working-people, and about 1850 was charged with the design and construction of the renowned "cités ouvrières" of Mulhouse. Soon after the completion of this task, he removed to Paris, publishing, about the same time, his well-known book, "*Habitations Ouvrières en Tous Pays*," afterwards remodelled by him in association with M. Emile Cacheux. In Paris, with M. Bouillon, he founded a great establishment for poor people, comprising laundries, baths and so on, which still continues to prosper, at the same time that, with some of his Mulhouse friends, he established the manufactory of porcelain and earthenware at Ivry, now one of the largest and most celebrated in the world. True to his habits of untiring industry and helpfulness, while bringing his factory to the foremost position in France, he interested himself constantly in the affairs of his Alma Mater, the École Centrale, in which he became one of the most popular instructors, as well as the most valued counsellor, serving as president after the death of the chemist Dumas; and, with his friend Trélat, he was principally instrumental in founding the École Speciale d'Architecture, at the same time that he created at Ivry a colony of working-people after his own heart, happy, contented and self-reliant, as well as sincerely devoted to him. It would take too long to mention even the names of the associations for benevolent purposes of which he was an active member if not the founder, but his connection with the recent Exposition, of which he was one of the most earnest promoters, should not be forgotten. His exertions for the success of the exhibition were too great for his strength, and soon after its close he was seized with an illness which proved quickly fatal. Like more Frenchmen than some people suppose, M. Müller was a man of deep religious conviction, and, although he was independent enough to direct that his body should be disposed of by what some persons call the heathen process of cremation, of which, on scientific grounds, he was an earnest advocate, his life was quite in keeping with his creed.

WORK on the Hudson River Tunnel is going on again rapidly. About two hundred men are employed, day and night, and more than half of the lower tunnel has been excavated. Curiously enough, after the remarkable successes of American engineers and contractors in carrying out work in foreign countries, this peculiarly American undertaking, begun under a system which no one but an American engineer would have thought of, or would have dared to try if he had thought of it, is to be completed by English contractors, with whom an arrangement has been made for excavating and lining the rest of the tunnel between the shafts. In accordance with the new contract, certain variations have been made in the details of construction. Instead of pushing forward a thin wrought-iron shield into the silt, and lining it with a heavy wall of brickwork, the English contractors will make their shield of cast-iron, two and one-half inches thick, and the lining of brick will be only a thin shell, intended to protect the iron from concussion in case of accidents inside the tunnel. It is supposed that the iron will remain for an indefinite period without corrosion, and that the tunnel in its new form will be stronger than under the original scheme.

ONE of the members of the Artisans' Commission which went from England to the Paris Exhibition, to see how work was done in France, was a decorative painter, who has written a rather amusing report of his experience. According to him, the average of decorative work in Paris is not so good as the London average. There is little or no decoration in Paris so bad as the cheap contract work in London, but, on the other hand, the best London work is done more carefully and solidly, and with better materials than the French. In design, however, he thinks the French workmen much surpass the English. Even in the lowest class of work, the drawing and design are good, and even bright colors are skilfully harmonized. In fact, so sure are the French decorators of the color-instinct of their men that they "scorn" the common Anglo-Saxon trick of "toning down" their colors with umber into feebly-tinted muds, incapable of exciting either disgust or pleasure; and even that more excusable resource of the bad colorist, outlining with black or gold the ornamental patterns which clash with the ground they are painted on, is seldom used in Paris. It must be gratifying to the artists of the Hôtel de Ville to learn that the London painter considers the interior decoration of that structure "one of the most satisfactory jobs" which he examined, but he mentions the interesting fact that the noble paintings with which it is to be adorned are mostly executed in the *ateliers* of the artists, on thin and very wide canvas, which is subsequently glued to the walls and ceilings of the building with a stiff mixture of white lead and varnish, with Japan gold-size as a dryer.

MR. HAROLD P. BROWN and his sympathizers should make a note of what, according to one of our English exchanges, Mr. Edison is reported to have said on inspecting the new plant for electric lighting in the southeastern district of London. This plant includes a dynamo forty feet high, capable of supplying an alternating current of ten-thousand-volts pressure. Mr. Edison, according to the story, was asked by the people interested what he thought of it. He thought, he said, of the eighth of an inch of hard rubber between that current and human life, and told them that when they got it done "they had better move their families into a powder-magazine." This ten-thousand-volt current has been spoken of before, but has been regarded as a myth. Now, however, that preparations are actually made for producing it, the public will be curious to observe, at a safe distance, the effect of its distribution. Whether it is to be carried by wires above or below ground, we are not informed, and it is very doubtful, as has been several times suggested of late, which would be the safest way. The fall of a "dead" telephone wire across a wire conveying such a fearful current overhead would be dangerous enough, but the cause of the danger would be easily removed; while the falling of the insulation from the same wire in an underground conduit might scatter its current through neighboring wires, and even through gas and water pipes, for hours before the matter could be remedied.

PHILADELPHIA

COMING ARCHITECTURAL EXHIBITIONS. — THE ART CLUB'S NEW BUILDING. — THE DEVELOPMENT OF PUBLIC TASTE. — THE YEAR'S WORK. — THE CONSTITUTIONAL MONUMENT.

THE Art Club's Exhibition, held on the occasion of the opening of its new house, included an exhibit of architectural drawings. Almost immediately after this exhibition comes the annual one of the Academy of the Fine Arts. Although the Academy admits no drawings that have been previously shown in Philadelphia, its coming exhibition of architectural work promises not to be seriously impaired by the one that is to precede it, for the Art Club, from lack of space — for the display of paintings promises to be very large — only allows two drawings to each architect. There is besides a disposition on the part of many men to make as good a showing as possible at this Academy exhibition, for its architectural room has now become a recognized yearly fixture, and shows, to a certain limited degree, the work of the past year. To come back to the Art Club: its new house that was formally opened on the 18th instant is, without question, one of the most successful pieces of architecture in the city. The interior is admirably planned to suit the wants of the Club, and includes a large gallery for exhibitions, receptions and the like. The main entrance to the building is on Broad Street, and the gallery which communicates directly with it has also an entrance on the Chancellor Street front. The house is of Indiana limestone and "Pompeian" brick, with a roof of purple tiles. It might be said to be in the style of the Italian Renaissance of the best period, with a leaning toward the French. The detail is well-studied, though without very much imagination, and is exceedingly dainty. There are many attractive features, as the projecting loggia on the northeast corner, with its graceful corbels, its elaborate Italian cornice and its overhanging roof. It is perhaps to be regretted, by the way, that this overhanging roof does not continue around the building, and yet the design has a breadth and unity that we do not often see in the new buildings of Philadelphia, unless associated with such stiffness as to take away all charm. Taken as a whole, then, the building is a dignified one, and one sees at a glance that it is what it is intended for — a club-house.

The fact that the T-Square Club of Philadelphia has captured the Gold Medal at Cincinnati for the best exhibit of club-work would seem to indicate that there was no lack of talent among our draughtsmen and younger architects. And such is actually the case, most fortunately for the future of the city's architecture. The good work that these younger men have done has not yet told very much amongst the vulgar gorgeousness that hems it in. But we are happily getting quite used to seeing here and there some little bit of good design that rests the eye and makes one wonder vaguely how a quietly-painted landscape would look on a background of circus-posters. By no means the least hopeful sign for the future is the growing appreciation of the public for what is good in design. An architect cannot be successful here who is too much ahead of the public; but the standard of public taste is most certainly being raised. The few good designs that have lately appeared on Chestnut and Walnut Streets have spread their benign influence as far north as Market Street. Some people have maintained that there is a sensible diminution in the number of cast-iron fronts on that thoroughfare that imitate rock-faced stonework, and that the popularity of sanded galvanized-iron as a substitute for stone is on the wane. The architects could never have brought about this most desirable state of feeling unaided. One of the chief reasons for it, no doubt, is the greatly increased facilities that are now offered for going to Europe. It is not worth while to insist on anything so evident as the improvement to the architectural taste of an appreciative American that follows a trip to Europe. But the journey does a vast amount of good to people who have neither taste nor appreciation. They are forced by the guide-books to admire certain cathedrals, they are told to look with respect on certain city fronts, and by and by there dawns upon them the conviction that something beside showiness is of advantage in a design. This latter class of travelled men has increased beyond all telling of late, and the faster it increases the sooner will come the downfall of that overloaded, offensive style of so-called architecture that has held its own with a persistency worthy of a better cause ever since what New Yorkers call the Jim Fisk era.

Last year was an extraordinary one in the number of buildings erected in Philadelphia, and few builders thought that this year would equal it. Yet, the first eleven months of this year show an increase of more than fifteen hundred buildings over the corresponding period of last year. The largest of these is probably Claus Speckels's refinery, said to have cost three million dollars, while the greater number were, of course, the little brick houses that creep out in unyielding rows farther and farther into the country. In a house of this sort — or a little larger, for it had three floors and a box staircase in the middle instead of at the side — there occurred two weeks ago a most shocking, and at the same time, most curious calamity. A baker's shop occupied the first floor and two families lived on the two floors above. A fire broke out in the baker's shop and filled the stairway. The alarm was given by a man who rushed out leaving the front door open. The entry, of course, filled with smoke. The occupants of the rooms opened their doors to escape, were driven back by the smoke, left their doors open and windows shut, and died of suffocation. When the fire was put out seven dead bodies were found. The fire had been confined to the first-floor entry and to the stairway to the second. It is not surprising that so many horrible accidents happen when people are obliged to use complicated fire-escapes, if, in this little three-story house, seven people are killed who might now be alive if they had not been too terrified to shut their doors.

Some time ago I mentioned the proposed monument in Fairmount Park to commemorate the adoption of the Federal Constitution The project has by no means died out, for the meeting of the Governors of the thirteen original States held here on the 4th of July has been followed by another meeting on the 10th instant, in Washington, where a bill was framed asking Congress for an appropriation. The amount, it appears, is not yet fixed upon, but will probably be about three millions dollars. If so much money as this is really to be spent on a monument, the importance of having as good a design and as good a site for it as can possibly be got cannot be overestimated. Philadelphia is, of course, more directly interested in it than any other city, and yet the monument is a national one, and when we consider what it is to commemorate, and especially when we reflect on the great danger that a project of this kind entrusted to a body of politicians runs of blossoming into some fresh abomination, some huge eyesore that can never be removed, it would seem the plain duty of every man who does not care to have his country a byword for its want of taste in these matters to do what he can toward starting this vast undertaking in the proper channel.

CHICAGO

THE AUDITORIUM BUILDING. — ITS COMPONENT PARTS. — THE INTERIOR DECORATION.

AT length the great Auditorium Building has been officially opened with all the accompaniment of pomp and ceremony consistent with democratic institutions. Not only were the various State and municipal officers out in full force, but both the President and Vice-President of the United States were here and saw dedicated the building within whose half-finished walls they had been nominated eighteen months ago.

The opening ceremony was certainly the most gorgeous spectacle of its kind ever beheld in the West. The audience-room, in itself an impressive sight, was made still more magnificent by 4,000 people arrayed in all their very best "purple and fine linen," not to mention gold and precious stones. In the eyes of all of the architects and many of the public there was, however, one thing lacking in all the ceremony and that was that Messrs. Adler and Sullivan, the architects to whose thought, study, and conscientious work the whole magnificent pile was due, were not even mentioned by name in the exercises and received no public recognition whatsoever. Now that the building is at length opened to the public, one may at least be able to judge of the general result even if some of the very minor details do still require a little going over and polishing and general finishing up.

"The Auditorium" as it is usually called, is a building occupying nearly one entire half of a block. It has a frontage of somewhat less than two hundred feet on the great thoroughfares — Michigan and Wabash Avenues, and some three hundred and sixty upon a smaller cross street. This latter and longest side is considered the front proper of the building and here is the large tower, with the main entrance to the great audience-hall. The great building really includes three separate structures, viz., an opera-house, an office-building and a hotel. With such variations and irregularities as the requirements of the different buildings demand, the hotel may practically be said to occupy the entire Michigan Ave. front and a portion of Congress Street: the office-building, the Wabash Ave., and also a part of the Congress Street side. While the great inner portion of the edifice is mainly occupied by the opera-house, which in itself is really "The Auditorium." It goes without saying that the whole construction is supposed to be absolutely fireproof.

The office-building and the Auditorium proper are now opened but the hotel is still in the hands of the workmen and will not be finished for several weeks yet, although it is even now a most interesting portion of the building to visit.

Externally the building is effective more by its size than by any architectural composition, and its dignity is due to its vastness. At

the south but not at the centre of the facade rises the large rectangular tower (41 by 70 ft. in size) to a height of about 240 ft., while on top of this for another 30 feet higher is a so-called lantern for the convenience of sight-seers and also for the protection of the various instruments in use by the U. S. Signal-Service station, which is in the seventeenth story of the tower. This tower is, of course, the great exterior feature of the building and both from the lake and from the south is an important object in the landscape. Probably for constructional reasons, a rather unusual form was adopted, the width of the face being nearly twice the depth. From many points of view this shape is certainly not as satisfactory as a square one would have been, and consequently the first sight is to strangers often rather disappointing, although it certainly does grow upon one since it has already become an object that every true Chicagoan has an affection for. The material of the building is gray granite and Indiana buff (Bedford) limestone: the lower three stories rock-faced and the upper seven dressed. The general form and outline of the openings, together with the main features of the building, mark the style as the modern Romanesque, although not extremely pronounced. The principal entrance to the Auditorium proper is through three massive arches in the tower which lead into the main vestibule and lobby. The first glimpse of this interior is extremely effective by reason of its marble mosaics, rich woodwork and decoration as well as by the air of breadth, size and dignity that prevails. Here one finds evidence of careful thought and study in the minor arrangements of cloak-rooms, retiring-rooms, smoking-rooms etc., all of which are so naturally and conveniently placed with reference to entrances to various portions of the house, as to be the subject of no comment.

From the lobby a large central staircase of marble and metal-work leads to the grand foyer where one really gets the first stunning effect of the splendor of the interior. The walls and ceilings are simply but charmingly decorated with creamy tints and gold: the great pillars with their rich capitals, the use of marble here and there, the general harmony of decoration and furnishing, and especially the evidences of size all impress one powerfully. Here as elsewhere, the arrangement of the multitude of electric lights adds rather than detracts from the general scheme of decoration.

In the interior of the great hall itself, the sight is one of the most remarkable of its kind in the world. This is due not so much to the beauty of decoration, for that is comparatively simple, but it is almost entirely the result of the splendid architectural lines and the vast sweep that one gets, not shut in by boxes, tier above tier as in the European opera-houses, but, with the exception of a very limited number of boxes, all parts open free and light, with the three galleries showing themselves as part and parcel of the scheme of construction. Over the stage sweeps the splendid proscenium-arch, while parallel with it from time to time spring others of those perfect eliptical arches, which in themselves are always lines of beauty.

After the first general effect one commences to examine details, and the decoration. Ivory and gold is the general theme, while there stand out three points upon which the artistic conceptions have really centred with the best effects. On each of the side walls, skilfully arranged are two panels where the decoration is radically different, being in fact two landscapes, one spring, and the other autumn, both charmingly executed by M. Fleury. Although such subjects form indeed a daring flight in decoration, yet these are most delightfully successful.

Over the proscenium a more conventional design by Charles Holloway is well executed upon a gold back-ground, in which numerous groups and figures express the manifold influences of music upon the human mind. The most important decoration of all, the arches and panels, is mostly plastic and then gilded. This work, while not in any of the conventional styles, is extremely light and delicate, and much of it is indeed of exquisite beauty. In fact throughout the building the scheme of decoration has been most delightfully carried out: onyx, rare marble and fine woods have been much used, and they seem very wisely to have partially served as the basis upon which to work up the decoration, while all the multitudinous details of capitals, metal-work, panels and carving show the direction of one master-mind, making the whole, by far the most satisfactory work of its kind in the United States.

Above the main foyer are the lobbies for the balcony and the two galleries, when the latter are to be used, for one of the ingenious devices in connection with these upper galleries is a hinged steel cove which can be lowered and then entirely closes off these portions from the main hall, while the lines of the cove itself join the lines of the decoration and are not noticeable. Thus the building can be used at its ordinary capacity of a little over 4,000 seats or, if desired, it can be reduced to about 3,000, while for great conventions it is estimated that arrangements can be made to permit 7,000 spectators within the hall.

From a musical stand-point one of the important features of the great hall is the organ, which is placed mainly in front of the proscenium arch and at the left of the stage. The decorative treatment of the front is in harmony with the rest of the hall, and the instrument is said to be one of the most perfect and pure in tone in the world.

As in the whole construction the practical and utilitarian side has always received the first attention, so the arrangement of the stage has particularly exemplified this point, as the most careful attention has been paid to all the details. It is modelled after the one at Buda-Pesth, said to be the most perfect in existence. All the framework including the rigging-loft is of iron and all the cables used for shifting purposes are of steel, and hydraulic elevators raise and lower portions of the floor as desired. The ordinary observer is completely aghast at the amount of machinery.

The ventilation and acoustics of the great hall seem to be extremely satisfactory and the only complaint that has yet been heard is that in the extreme parts of the house one is too far away to see well. Besides the main auditorium is, also, a very pretty little hall located on the seventh floor, known as Recital Hall, which has a seating capacity of about five hundred persons. The decoration in cream and gold is very dainty, and it is only to be wished that what has been said about acoustics and ventilation of the great hall could apply equally well to this room. As for the hotel portion, that has not yet been formally opened, and all that one may say about it is that it is expected to be like the auditorium itself — without any equal in the United States.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF HERBERT JAQUES, ESQ., CHESTNUT HILL, MASS. MESSRS. ANDREWS & JAQUES, ARCHITECTS, BOSTON, MASS.

[Helio-chrome, issued only with the Imperial Edition.]

HOUSE OF HERBERT JAQUES, ESQ., CHESTNUT HILL, MASS. MESSRS. ANDREWS & JAQUES, ARCHITECTS, BOSTON, MASS.

CHURCHILL HALL, WHITEMARSH, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

ST. ANDREW'S METHODIST EPISCOPAL CHURCH, NEW YORK, N. Y. MESSRS. J. C. CADY & CO., ARCHITECTS, NEW YORK, N. Y.

DESIGN FOR A CHURCH AND CHAPEL, HARRISBURG, PA. MR. J. J. DEERY, ARCHITECT, PHILADELPHIA, PA.

HOUSES ON DELMAR AVE., ST. LOUIS, MO. MR. W. ALBERT SWASEY, ARCHITECT, ST. LOUIS, MO.

HALL IN OLD HOUSE AT MONTICELLO, N. Y.

HOUSE ON HARPER FLAT, LOS ANGELES, CAL. MR. W. REDMORE RAY, ARCHITECT, LOS ANGELES, CAL.

AUSTRALIA



THE SIDNEY TOWN-HALL AND ITS ORGAN. — A NEW ATLAS OF AUSTRALIA.

THERE is little that is new in our architectural world — little, at any rate, that is worth recording — but we are now approaching, we devoutly trust, the end of what has been, financially, a most disastrous year. A phenomenal rain-fall during the last six months gives promise of a splendid season, and in a country like New South Wales, where pastoral interests are so largely represented, everything depends on the seasons.

The organ spoken of in your issue of the 10th of August as being somewhat remarkable in possessing lengthy pedal-pipes which produce an inaudible note has not yet arrived from England, and, even if it had, the Town-hall is not yet ready to receive it. The date of opening had been definitely fixed for the latter part of November, but, judging from appearances, the end of the year will scarcely see the building finished, and the late strike of London dock-laborers has delayed the shipment of the organ. Besides, at least two months will be expended in erecting this musical giant. But the ceremony, which is to be on a grand scale, will take place all the same, for the gentleman who now fills the mayoral chair, and whose mayoralty terminates in December, is bent upon having his name identified in some way with the finest city-hall in Australia. Of the building itself, however, I shall defer speaking until after the formal opening, but a few notes with regard to the organ may be of interest. In the first place, it has been built at a cost of some $75,000 by Messrs. Hill & Sons, of London, and is said by them to be the largest in the world. It is about 60 feet high, 45 feet wide without the wings (which almost double the width), and covers about 200 square feet of floor-space. It is worked entirely on the pneumatic system, and is blown by a gas-engine. It has no less than five key-boards and 126 stops, and is considered by those who have heard it to be "only inferior to the famous in trument at Freiburg." These critics seem

to altogether ignore Manheim and Palermo and the organ in the magnificent church at Monte Cassino, which is so highly praised in W. C. Prime's charming book, "*I Go a-Fishing*."

Speaking of books reminds me that the last part of "*The Picturesque Atlas of Australia*" has just been issued, completing the third volume of a superb pictorial and literary history of our country. This work has been published by an American firm, and the illustrations, by American and local artists, have been produced under the superintendence of Mr. F. B. Schell. All the drawings are good, especially those by Schell, Fitler, Smedley and J. R. Ashton, and it would be difficult to conceive anything better in the way of wood-engraving than some of the work in these volumes. Mr. Schell left here some little time ago to assume the management, I believe, of the artistic department in Harper's publishing house in New York.

Another important work of a very different description has recently been completed here, the success of which is in no small measure due to the enterprising American contractors who carried it out. I allude to the new bridge over the Hawkesbury, the river which Anthony Trollope thought worthy to be compared with the Rhine.



PARIS:

THE BRAZILIAN, THE ARGENTINE AND THE MEXICAN PAVILIONS. — M. EIFFEL'S EXHIBIT. — THE PAVILION OF THE PASTELLISTS.

THUS far we have not discovered in the pavilions of the American Republics many traces of originality. We have rather reproached them with being without character or style, making an exception only in the cases of San Salvador and Venezuela.

To-day we will examine more interesting buildings — those of Brazil and the Argentine Republic. The Brazilian pavilion, although not properly belonging to any style, does not lack a certain originality of character. M. Louis Dauvergne, the architect, secured the work in competition. The very simple plan falls within the lines generally adopted; that is, a hall of the full depth surrounded by galleries. Here the importance of the Brazilian exhibition has called for two tiers of galleries. The garden is also annexed to the pavilion. The architect has been enabled in a small space, 400 square metres for the construction and 800 for the garden, to produce the illusion of quite a large affair. The construction is wholly of iron interiorly. Near the hall, which measures 19 x 14½ metres, and forms the great hall of the exhibition, we find a little gallery set apart for the fine arts, and at one side a room for the commissioners. The staircase gives access to the upper galleries and to a campanile. The pavilion is arranged in such a way that it can be entered from every side, and so has not what might properly be called a principal façade. On the side next the Argentine Republic, in front of which it is placed, and from which it is separated by a too narrow alley, the façade is pierced by three large, full-centred bays, between which are statues representing the rivers of Brazil — the Parana, the Amazon, the San Francisco and the Parahiba — and above, lighting the second-story gallery, are small arched windows arranged three by three. In the axis of the façade a *motif* projects through the roof-line, and is crowned with a globe. On the right stretches the garden, ornamented with Brazilian plants, at the back of which an iron portico connects the pavilion with a greenhouse. This façade forms a very agreeable whole in connection with the greenhouse and the garden, which enframes it with verdure and gives it an exotic air. The other façade is no less successful. It is pierced by two large bays similar to the others, and in like manner decorated with statues representing the Rio Tiete and the Rio Tocantins. The same motives of decoration are found here: prows of vessels project from it, pilons at the angles are crowned with escutcheons, etc., but on the left this façade is flanked by a flat roof which covers the room of the commissioners, and a little behind rises a tower terminating in a campanile, from which a view can be had over the gardens of the Champ de Mars: this tower, of slightly Hindoo character, forms an interesting beacon. Finally, the roof, covered with zinc and ornamented with a cresting of nice design, successfully crowns the building.

We then come to the pavilion of the Argentine Republic, which is richer and more brilliant. The architect, M. A. Ballu, had this advantage over his colleagues: he had at his disposal a very large appropriation. The total amount, in fact, was a million, not including the furnishing and lighting, and out of this very respectable figure 200,000 francs were reserved for works of art. Aided by such resources, and seconded very ably by M. Adrian Chancel, M. Ballu was able to give his building a richness of decoration which we find nowhere else. Perhaps we may blame this pavilion for a too great regularity and a lack of outline, but this defect is offset by its color and brilliancy.

This pavilion, also, is of iron, and is to be taken apart and rebuilt at Buenos Ayres: it occupies an area of 1,700 square metres, and is composed of a large rectangular hall, with a small room on the ground-floor at each side of a central staircase which leads to the upper story. This is of the same area as the ground-floor, except the space in the centre of the pavilion, which rises clear to a large dome. This dome, decorated on the outside at its spring with mosaic relieved with jewelled bull's-eyes of different colors, is surrounded by four other smaller domes, and is formed, as they are, of glass. The entrance from the outside, which is very richly decorated, is accentuated by two arches, one of which is a large one on the axis, and beneath it three doorways give entrance into the large hall on the lower floor. A flight of steps stretches the full width of these doors, and a decorative group in gilded bronze, due to the chisel of M. Hugues, statuary, a former Prix de Rome, *silhouettes* itself against the glass of the central arch.

The three arches are decorated with terra-cotta, with large, red bull's-eyes in glass, and with mosaic executed by M. Facchina. Above the smaller arches the tympana are decorated with two mosaics, representing one a shepherd in the midst of the pampas, a composition by M. Barrias, and the other a laborer, by M. Roll.

The sub-basement of the two buildings and the lateral and rear façades are of polished *grès*, brown in color, which has a very pretty effect. This stonework, executed by M. Müller, forms a new and very interesting element of construction. At the upper end of the court is a frieze of cats geometrically treated with much originality. The two wings of the façade are each pierced by three bays, framed by a large border of turquoise-blue tile-work, by M. Parvillée, and form at the first story a gallery or *loggia* with a revetement of green tiles. Each bay includes three arches resting on iron colonnettes, with projecting balconies. Underneath is a frieze of blue bull's-eyes, and in the basement are three rectangular bays corresponding with the arcadings of the *loggia*, the terra-cotta sills of which are decorated in tile-work, illuminating the lower story. Large cut-glass bull's-eyes form a framework all about the pavilion, and ornament the metopes between the iron corbels which support the terra-cotta gutter. At the angles are four pilons covered with porcelain and applications of cut-glass. This feature, executed by M. Parvillée and drawn from Argentine documents, has a striking appearance, though it has the air of glass trinketry, and so is out of place in an important construction — at least, it shocks one to see it in our country. But the great interest in these pilons lies in the application for the first time of enamelled porcelain, especially made for the building by M. Parvillée, who also made use of it on the dome of the Palace of the Liberal Arts, the domes of the Algerine Palace, and also for the panels of the intercolumniations of the first-story gallery of the Eiffel tower. The pilons of the pavilion of the Argentine Republic are crowned with four groups sculptured by M. Barrias, and decorated with medallions, engraved by M. Dupuis, which represent the Argentine provinces. The lateral faces are treated in the same manner as the principal front, and are pierced by three arches, the central one of which is the most important. All three are enframed in mosaic-work. The rear façade presents almost the same appearance as the front, except that the central part is occupied by the staircase, which projects from the wall, and is lighted through a large arch. All this forms a scheme altogether too regular and uniform. Inside, the nave is wholly of iron, except in the decoration of frieze, vault, pilaster, etc., and is inspired from Argentine *motifs*, generally geometrical. The pendentives of the grand dome are ornamented with sculpture, which represent Agriculture, by M. Gauthier; Commerce and Industry, by M. Turcan; Art, by M. Lefebvre; and Science, by M. Pepin. The ornamental frieze of this dome is decorated with medallions of personages illustrious in the history of the Argentine Republic, and executed by MM. Lameire and Toussaint. A great number of paintings signed by our best artists ornament the smaller domes. These are Agriculture: — Fishing and Cultivation of the Vine, by T. Robert-Fleury; The Development of Wood and the Cultivation of the Sugar cane, by St. Pierre; Commerce: — Copper-mining and Tanning, by M. Besnard; Telephone and Railroad, by Gerveux; Arts: — Architecture and Sculpture, by M. J. Lefebvre; Painting and Music, by H. Leroux; Science: — Physics and Chemistry, by M. L. O. Merson; Astronomy and Electricity, by M. Cormon.

The glass windows are also interesting. The chief one is the large window on the staircase, by M. C. Toché, which represents the French Republic and the City of Paris welcoming the Argentine Republic to the Exposition. This composition is very decorative, although in certain parts a little crude in color: for instance, in the first plane a municipal-guard is seated upon a horse which is altogether too red in tone; but the general effect is interesting, and certain groups very happily arranged are superb in color. The other large windows are also filled with fine glass, decorated with plants, and vases with symbolic escutcheons in the centre. A very fine border formed of escutcheons, separated by a *motif* where we find again the geometrical cats of the façade, serves as a framework for the window over the entrance doorway.

From this rapid description and the names of the artists who have associated together in the work, it is easy to see that the pavilion of the Argentine Republic is of incontestable interest. The whole is

very brilliant in effect, and the glass bull'seyes, lighted at night by electricity, give it a fairy-like air.

Near these two elegant constructions, the Mexican pavilion makes a contrast by its heavy and squat form, but this heaviness is intentional. It is powerful, and marks in a very particular way the character of Mexican buildings. Nevertheless, we find fault with it that it represents in glass and wrought-iron a construction which was inspired from ancient monuments of stone. This is quite shocking, and the wholly insufficient excuse given is the cost of transporting this pavilion to Mexico, where it is to be hereafter erected. We find a very interesting description of this building in the report addressed to the Minister of Public Works by M. Antonio Penafiel, Director of the Statistical Bureau, who has charge of the archæological portion: "The form in this edifice has been borrowed from that of the ancient Aztec 'teocallis,' and the ornamentation of purely Mexican origin has been taken from the drawings in the work '*Monumentos del'Arte Mexicano Antiguo*,' by MM. Domingo Carral, José N. Roviroza and Julio Penafiel.

"The building, which measures 70 metres in length by 40 metres in breadth and 14½ in height, consists of the central portion and two lateral pavilions. The middle part, a compendium of the Mexican faith, exhibits the religion of the worshippers of sun and of fire. A large basement bears on its lower part the signs of this faith, and upon its upper part the *braseros* symbolic of its periodic festivities. A succession of *gradins*, the principal characteristic of the ancient temples, conducts to the portico, where are found two caryatides, whose configuration has been derived from an archæological study recently made at Tula de Hidalgo, with the object of finding a support or column which could be applied to Mexican architecture.

"The portico has for its crowning feature the symbol of the Sun Tonatiuh presiding at the creation of Cipactli, which represents the fertilizing force of the earth which nourishes the human race. In order to make them harmonize with the purposes of the International Exhibition, we have placed the mythological groups in pavilions at the right and left of the building. In the first the goddess Ceuteotl, protectress of agriculture, having at her right Tlaloc, the god of rain, and her left Chalchiuhtlicue, the goddess of water. These three divinities, according to Aztec belief, gives life to man and fertility to the fields. In the first pavilion at the left are prepresented Xochiquetzal, the divinity of the arts, Camaxtli, god of the chase, and Yacatecuhtli, the god of commerce. Finally, to personify with its fundamental events the ancient Mexican history, there have been erected two groups in one of which the king Tzcoatl, the real founder of the nation and of the monarchy, and at his sides his contemporaries Nezahualcoyotl, the poet king, and Totequihuatzin, representing the triple alliance of Mexico, Texcoco and Tacuba, which had so great influence on the conquests of the Mexican kings. The other group represents the end at once heroic and tragic of the Aztec monarchy: Cacama, Cuitlahuac and Cuauhtemoc, the first, king of Texcoco, valiant martyr in the defense of Mexico, the second, the popular hero of the Sorrowful Rock the conqueror of Cortez in his retreat to Popotla, and, finally, the grandest artistic figure of national heroism, Cuauhtemoc, the last emperor of Mexico.

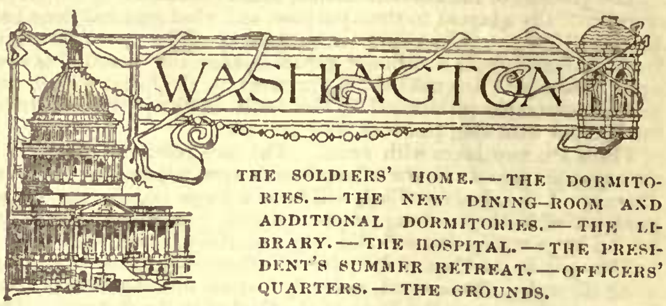
"In fine, the central part of the building represents the capital ideas of religion; the extreme pavilions represent agriculture and the arts, and intermediate figures the commencement and end of ancient Mexican civilization."

To finish the series of American constructions, there remains to be mentioned the curious little pavilion of Equador. It is a square building in the Peruvian style, whose general appearance is allied with the monolithic door of Tianuaca. A frieze of birds, roughly cut, stretches around this very interesting pavilion, which is also guarded by enormous frogs cut in granite.

From this description of the pavilions of the American republics, we see how largely they have aided the work of the French Republic. They form the principal attraction of one entire side of the gardens of the Champ de Mars, where beside them is found only the pavilions of Suez, a structure of quite secondary interest, and the children's palace, which was gradually transformed into a theatre and bazaar.

On the other side of the Eiffel tower we meet with some other foreign pavilions, through which we must pass rapidly. Here is the Finland pavilion, the Russian Isba, the Norwegian and Swedish châlets—all built of wood in their several national styles. The diamond-cutting booth Boas is placed within the charming specimen of Dutch architecture of brick and stone: this is one of the prettiest things on that side of the Exposition. Not far from this is found the pavilion of M. Eiffel, where the eminent engineer exhibits models of a few of his principal works. A model at one-fiftieth of full size of the Garabit viaduct shows the system employed for the raising of the arch which sustains the metallic girders suspended at a height of 122 metres, and under which might stand the Church of Nôtre Dame bearing the Vendôme column on one of its towers. Let me call your attention for a moment to this viaduct, one of the best works of M. Eiffel. It has a total length of 564.65 metres, and the span of the arch is 165 metres. This arch, like the arches of the Machinery Gallery, is articulated at its base the same as the bridge over the Douro, whose arch is 160 metres in span. Several photographs and designs show the bridge of Benluc in Cochin China, which is 390 metres long, with span of 60 metres; the bridge Tan-An, also in Cochin China, whose central span measures 80 metres, and, finally, bridges at Cubzac, Szegedin and Vienna. The covering of this little building is another example of this great engineer's work: it is the floating dome for the great observatory at Nice, the movable part of which weighs 95,000 kilogrammes.

On the platform of the Palace of the Fine Arts are two interesting constructions, the pavilion of Monaco and that of the Pastellists. The pavilion of Monaco is composed of a large central hall, flanked at the four angles by small pavilions, in front of the portico or *loggia*, to which approach is had by a flight of steps. At the other end the hall opens on a semi-circular conservatory. The building, the work of M. Janty, has the character belonging to Italian villas. The interior and exterior decoration is in great measure made of faience work of the country, and is sufficiently remarkable. The pavilion of the Pastellists is quite elegant, and of a character which agrees well with the delicate works of art which it encloses. Imagine a Louis XIV bon-bon box finely decorated with carving representing trellis-work on *gaines* surmounted by heads of satyrs, and enframing niches crowned by female figures with garlands and cornucopias. Enlarge this bon-bon box; at the angles of the balustrade which crowns it plant masts supported by infants, in the elegant niches place vases after the style of Versailles, and you will have the charming little pavilion designed by M. Jacques Hermant.



THE SOLDIERS' HOME.—THE DORMITORIES.—THE NEW DINING-ROOM AND ADDITIONAL DORMITORIES.—THE LIBRARY.—THE HOSPITAL.—THE PRESIDENT'S SUMMER RETREAT.—OFFICERS' QUARTERS.—THE GROUNDS.

THERE are few people who do not think that the Soldiers' Home is a park maintained by the Government, for the benefit of old and disabled soldiers. The fact is, that the park is owned by the soldiers, a certain amount of their salary or wages being deducted every month to keep it in order and make the proper additions to the buildings.

The old main building which is built of marble, was designed by F. S. Alexander, an engineer and architect, in 1853. In plan it was T-shaped, and Norman Gothic in design. Its effect would have been pleasing if it had not been finished with an incongruous French roof. In the last two years a northern end has been added, from designs of W. M. Poindexter. A large dining-room is placed on the first floor, capable of seating about six hundred. In the basement is the billiard-room, and in the upper stories are bed-rooms. The exterior is of white marble, and the lower stories are designed to harmonize with the old building. Instead of the disagreeable mansard roof, a third story, lighter than the lower parts of the building is added, with a battlemented cornice above, suitable in this case as a suggestion of the military character of the occupants. The whole capped by a low-pitched hipped slate roof.

The French roof has been removed from the older building and it is being finished out in the same style as the northern addition. The front tower is to be carried up to a greater height, and instead of its French roof is to have a flat roof with a battlement, or a low, hipped slate roof. The effect of the rejuvenated building is very pleasing. The treatment is simple and refined. The massing of walls and grouping of windows having been well-studied apparently, while the roof without a dormer makes a harmonious finish to the whole.

Just north of the main building, is the library, designed by J. L. Smithmeyer. It is totally different in feeling from the first, having high-pitched, gabled, and hipped roof, with little turrets, louvres and finials. This building is one story high, and half-timbered with the spaces between framing filled-in with brickwork; this was intended for a bowling-alley, but is now used as a library, the building being entirely too costly to be used as intended.

The designing has been effectively done, the building being artistic and attractive. The gate-lodges, of which there are four, are all fairly good in appearance. One built of granite with jambs and trimming, I consider the best. The chapel is a small Gothic structure, in red sandstone. The house in which the presidents spent their summers until Cleveland changed the custom, is an unpretentious stuccoed cottage. The officers' quarters, some of brick painted, others of marble, are neither attractive nor repulsive in their appearance, being good examples of the mediocre effects that may be obtained in design.

The buildings described give all that is good as well as all that is indifferent, as the other buildings are positively bad in design.

The hospital built on a high hill is nondescript in character, and unpleasant to look upon; but from a utilitarian standpoint I believe that it is remarkably successful. The heating and ventilating, which was done under the direction of Dr. John S. Billings, has worked well, the temperature being easily kept at the same degree, while an abundant supply of fresh pure air is introduced without preceptible draughts. The engine and boiler house, some distance from the hospital, is much better from an architectural standpoint then

the hospital in itself. The inlet for the fresh air is treated so as to look like a small summer-house.

Here the hand of the Army Engineer is again seen in connection with Government Buildings. One of the new dormitories, conspicuously located so it can be seen from the main road, mars the view. Here we have a good contrast between the abilities of an architect and an engineer as a designer. Poindexter's main building dignified, simple, scholarly, and pleasing in all its outlines and details, Captain Davis's dormitory, a box, with porches, fussy little details of cast-iron and jig-saw work, every part badly proportioned in itself and in connection with the other portions of the building; the whole finished with an ill-looking mansard roof that would truly have astonished Mansard. I always thought, until I made inquiry, that it was constructed by some of the carpenters on the place, probably making their designs as they went along. It never occurred to me that it was designed by one of our learned and scholarly Army Engineers, although it is a building of considerable cost and size.

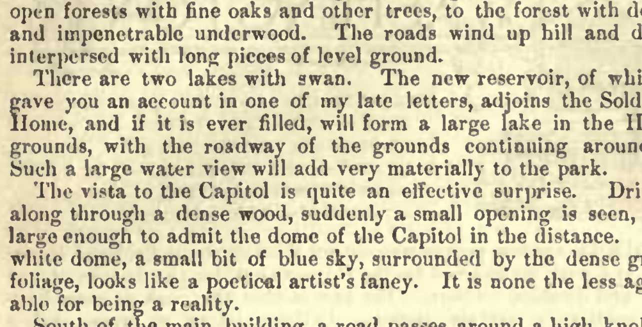
Washingtonians and the many thousand visitors who make a pilgrimage to the Soldiers' Home, should feel truly thankful that the design for the main building was made by an architect and not by an Engineer officer.

The grounds of the Soldiers' Home, which contain about 500 acres, were naturally adapted to their purpose, and what man has done has been well done. The roads are excellent. The scenery varied, from cultivated fields and flower gardens, large and beautiful lawns, open forests with fine oaks and other trees, to the forest with dense and impenetrable underwood. The roads wind up hill and down interpersed with long pieces of level ground.

There are two lakes with swan. The new reservoir, of which I gave you an account in one of my late letters, adjoins the Soldiers' Home, and if it is ever filled, will form a large lake in the Home grounds, with the roadway of the grounds continuing around it. Such a large water view will add very materially to the park.

The vista to the Capitol is quite an effective surprise. Driving along through a dense wood, suddenly a small opening is seen, just large enough to admit the dome of the Capitol in the distance. The white dome, a small bit of blue sky, surrounded by the dense green foliage, looks like a poetical artist's fancy. It is none the less agreeable for being a reality.

South of the main building, a road passes around a high knoll on which Scott's statue stands. The view from this knoll is very fine: I do not know of a better one away from the mountains. The city of Washington is in the foreground, with the Capitol, the Washington Monument, and other Government buildings standing out prominently in different parts of the city. Beyond is the broad Potomac branching east and west, embracing the city in its arms. Beyond the branches of the Potomac is a line of undulating hills. Arlington, the home of Custis and Lee on the Virginia side, the house just peeping out through a clearing; here Sheridan with thousands of Federal soldiers are buried. There is some talk of moving Grant's body here also. On the Maryland side is St. Elizabeth's, the United States Insane Asylum in the distance having very much the effect of an ancient castle. Down the river Alexandria comes plainly in view, and Fort Washington can be seen in clear weather.



CONVENTION OF THE ONTARIO ASSOCIATION OF ARCHITECTS. — THE ASSOCIATION'S ACT OF INCORPORATION. — THE PAPERS READ. — ADVERTISING ON BUILDINGS IN PROGRESS. — SIGNING BUILDINGS. — COMPETITIONS. — THE OFFICERS.

THE Ontario Association of Architects held its first annual Convention in Toronto at the Canadian Institute on November 20th and 21st. Mindful of the fact that the American Institute and the Western Association of Architects were holding their first joint Convention in Cincinnati, one of the first acts of the Ontario Association of Architects was to dispatch a telegram to them of greeting, to which an answer was received reciprocating their good wishes. Some time previously the American Convention had invited members of the Ontario Convention to attend their meeting, and they would have been glad to respond had it not been for their own meeting which took place on the same days.

The Ontario Association was eight months old on the first day of the Convention, and it is doubtful whether any association of so youthful an age could have presented such a satisfactory and healthy appearance as did the society in question. It will be remembered that this Association was called together and formally founded in the spring of the year for the purpose, generally speaking, of the advancement of the profession in the Province, the special object in view being an Act of Incorporation, not merely on the selfish ground of doing the profession good, but for the benefit of the public who now suffer so exceedingly at the hands of uneducated practitioners.

Sixty-three architects responded to the call of the Toronto Architectural Guild and formed themselves into this Provincial association, and since that time the membership rapidly increased to ninety, or, as the Secretary's report states, ninety-three per cent of the architects of the Province. The remaining seven per cent being practitioners whom the Association has, at present, been unable to reach. During the past year the Board of Directors have been indefatigable in the interests of the Association, and, at the end of this first eight months of its existence, the Association cannot but feel that it is established on a sound foundation.

In connection with the Convention an exhibition of architectural drawings was arranged, and the result goes a long way, even if nothing else did, to prove the very hearty interest taken by the members in their new association. The exhibition is one of which the province may well be proud, and the interest taken by the townspeople, who have visited it, in unusually large numbers (for an exhibition of the kind) during the week it has been thrown open to the public, indicates a more than passing appreciation in the work of the profession, and augurs well for its future.

The President, Mr. G. W. Storm, of Toronto, in his opening address alluded to the honor of the position of first President which had been conferred upon him, and congratulated the members on the unparalleled success that had attended their efforts to form the Association, comparing the result with the results of efforts made in time past to organize other societies of kindred objects. He said that the public at large are beginning to call for some guaranty of the ability of persons calling themselves architects, and that it is the main object of this Association to afford them that guaranty. This object is to be obtained by the registration of architects who would practice within the Province, by the education of the students and by examinations for proficiency and the issuing of certificates of competency to successful candidates.

The Secretary, Mr. S. H. Townsend, alluded to the advantage the Board of Directors had had in correspondence with Mr. Hugh Romien Gough, late President of the Society of Architects in England, who, as the leader of the registration movement in the mother country, courteously afforded them a great deal of valuable information on the subject.

The draft Act of Incorporation was the principal object of the Convention, and it was very carefully and thoroughly discussed and amended where necessary at an evening session of the whole Association on the 20th.

The preamble states that, "Whereas it is deemed expedient for the better safe-guarding of the public interests in the erection of public and private buildings in the Province of Ontario, and in order to enable persons requiring professional aid in architecture to distinguish between qualified and unqualified practitioners, and to ensure a standard of proficiency in the ability of persons practising the profession of architecture in the province, and for the furtherance and advancement of the art of architecture, be it, therefore, enacted," etc., and thus is defined the real objects of the Association.

Several papers were read of general interest, among which were "The Orange, N. J., Sewage-Farm," by Mr. D. B. Dick, Mr. Gordon's "Foundations," Mr. Curry's "Competitions," Mr. Burke's "On Professional Ethics," and "Office-management," by Mr. Gambier-Bousfield. Discussions followed each paper, but the amount of actual work to be done curtailed the time for the papers which were secondary to the principal object of the Convention. Time and space prevent my doing justice to these papers, but I may mention, *en passant*, one or two results. A custom of advertising by means of sign-boards, placed in conspicuous positions on buildings in course of construction by the architects who are carrying them out, which has been adopted by some men recently, was deprecated by a motion unanimously agreed to, while, at the same time, the engraving of the architect's name on the buildings he has executed was approved of.

The responsibilities of the architect with reference to the issue of his certificates was discussed, and it was resolved that the Council (the new name for the "Board") should take up the matter and endeavor to draft a certificate which would meet the requirements of all concerned.

Competitions being a subject in which each individual architect is interested, Mr. Curry's paper deserves more than a passing notice. The author called attention to the fact that a competition is a lottery, all try for what one may get; the professional referee may be incompetent, or biassed, — "He may not possess the judicial mind which will weigh every point for and against each design," so that for these reasons alone, success is a matter largely of chance. "That the best designs submitted is not adopted is of frequent occurrence, and it also happens that a poorer design is erected as the result of a competition than would have been the case if the client had used ordinary care in selecting an architect, and had been able to consult with him and give him directions upon every point of requirements." But as competitions are desirable under certain circumstances the author gives a set of rules and conditions for the conduct of a "model competion," unhappily too long to reproduce here. A few points, however, may be interesting in a special degree from their novelty. One is in reference to the commission to be paid to the successful architect, if his ability warrants the Directors putting the work into his hands. He shall be paid the usual and customary commission, provided he is able to show that "he has regularly charged five per

cent. If, however, he has not hitherto charged so much, his services shall be remunerated at the rate at which he has himself valued them at." Three experts are recommended for every competition, one of whom shall have been regularly engaged from the outset to prepare plans himself *not for competition* but with a view to making himself thoroughly familiar with the details of the subject. "Instructions to the Experts" will be sent round to all competing architects with the "conditions," so that each may know upon what basis his plans will be adjudged. The amount of work given to the "referee" to accomplish is considerable, entailing close study and occupation of several days, if not of weeks, which would greatly interfere with any architect's regular work, but the idea is worthy of note, as it goes to show the amount of work really necessary on the part of the "expert," to enable him to arrive at a fair decision as to the respective merits of each design. The name of the "expert" should be mentioned that competitors may be able to determine whether they are prepared to accept that man's decision in the event of their submitting a design, and also that there may be no risk of having their designs submitted to incompetent men, chosen at the eleventh hour.

Officers for the ensuing year were elected, the old "Board" being returned as the new "Council," the only change being that Mr. Swart, of Ottawa, takes the place of Mr. Mulligan, of Hamilton, as one of the Directors.

The Convention adjourned, but the Toronto members had invited all the visiting members to dine with them that evening, and a most successful Convention was capped with a most successful "evening," so that altogether this first annual Convention of the Ontario Association of Architects will be long remembered.





THE ARTS AND CRAFTS EXHIBITION.

IN the new gallery, in Regent Street, there was recently a most interesting exhibition held under the auspices of the Arts and Crafts Exhibition Society, which has been established, under the Presidency of Mr. Walter Crane, for the purpose of encouraging the growth of an artistic spirit in the manufacture of the various articles — useful and ornamental — with which we furnish or adorn our houses, and it would not be easy to find a movement in which the true architect would extend more sympathy than a really earnest effort to kindle in the public breast some love for the beautiful, even in the common things of every-day life. To be sure it is a hard enough task. I might also say, the absolute perversity which is, alas, too often displayed in matters of taste, has almost succeeded in choking and stifling any despairing efforts that individual handicraftsmen might have felt inclined to put into his work. Art is a tender plant, and if not carefully tended and cultivated by generous recognition and encouragement, it will soon die away and give place to that mechanical lifeless feeling — or want of feeling — which is the curse of modern workmanship.

Therefore do we — humble devotees of the great Goddess Architecture — rejoice that such a society as the Arts and Crafts Exhibition Society should have been founded, and that it should be pursuing its crusade in such an energetic and admirable manner. It was impossible to give even a cursory glance over the many graceful and beautiful objects on view in the new gallery without at once recognizing the value of the work the society is doing.

The exhibition was the second that the society has held, and was in every way an improvement on its predecessor. It was not only larger, but more comprehensive and I venture to think, compared very favorable, to quality with that of last year. The northern gallery was almost entirely devoted to examples of surface-decoration, stained-glass windows and the like, prominent among which (44) was Mr. Henry Holiday's drawing "Of such is the Kingdom of Heaven." The grouping, figures, draughtsmanship and color of this delightful composition are alike, excellent. Just above (43) was a cartoon for a circular stained-glass window, by the same artist. Within a few feet of these, exhibits (45) were three of Mr. Lewis Day's inimitable pieces of surface-decoration, and other examples from this master's hand, could be seen about the room. They were quite in his best form and there is hardly a discordant note either in the design or color of any of his compositions.

Mr. E. Burne-Jones, A. R. A., was represented by a "design for a two-light window" (50), in which there is some singular figure-drawing of children, which will scarcely add to the artist's reputation.

The actual window was shown in another room, and contained an egregious blunder, which it is impossible for an architect to pass over, even though he be accused of straining at a gnat.

We do not expect an artist to be acquainted with all the mysteries of stone-jointing, but we do expect him to have common-sense enough to think a little about his architecture and refrain from perpetrating such an atrocity as this. The end of the room was occupied by a large cartoon for sgraffito (66) which deserved attention from its vigorous treatment, as it did not fall into that "hardness" which is the bane of this beautiful form of decoration. Just over this was (67), was a carefully modelled and gracefully designed plaster panel for the new Public Library, at Hertford, by Messrs. Reginald I. Blomfield and Joseph Wilcombe. Mr. Walter Crane was represented by a group of cartoons and panels on the eastern wall, which were hardly up to his usual style, indeed, Mr. Crane seems a little out of his element in the tinted gesso panels that he has attempted. Two particularly unsatisfactory specimens — interesting experiments, the "*Builder*" dryly terms them — introduce a figure in modern evening dress, and it is curious indeed that Mr. Crane should see anything in this singular costume worthy of modelling. Mr. Crane also gave us (110) a settle in painted wood, which contains some good examples of color decoration. Conspicuous on the settle are the words "Liberty, Equality, Fraternity," so it may be presumed Mr. Crane intends the article for his own use. This artist was, however, seen at his best in the gallery where he was represented by some exquisite little gems of figure-drawing, in pen-and-ink (654), and in color (700).

Mr. I. J. Cobden Sanderson was represented by a case containing specimens of book-binding in morocco, all designed, bound and tooled by himself. They were all of great beauty, perhaps the two best were small examples in dark blue and maroon respectively. One singularity about these books is that the backs are concave instead as usual convex. The result is strange, and not pleasing to the eye, but it seems a sensible idea. An interesting exhibit was the illuminated address presented to Mr. Gladstone on the occasion of his golden wedding by the members of the National Liberal Club. It contains a frontispiece by Marcus Stone, five pages of address by Lewis Day, Alfred Parsons, Henry Holiday, J. MacWhistler and Walter Crane.

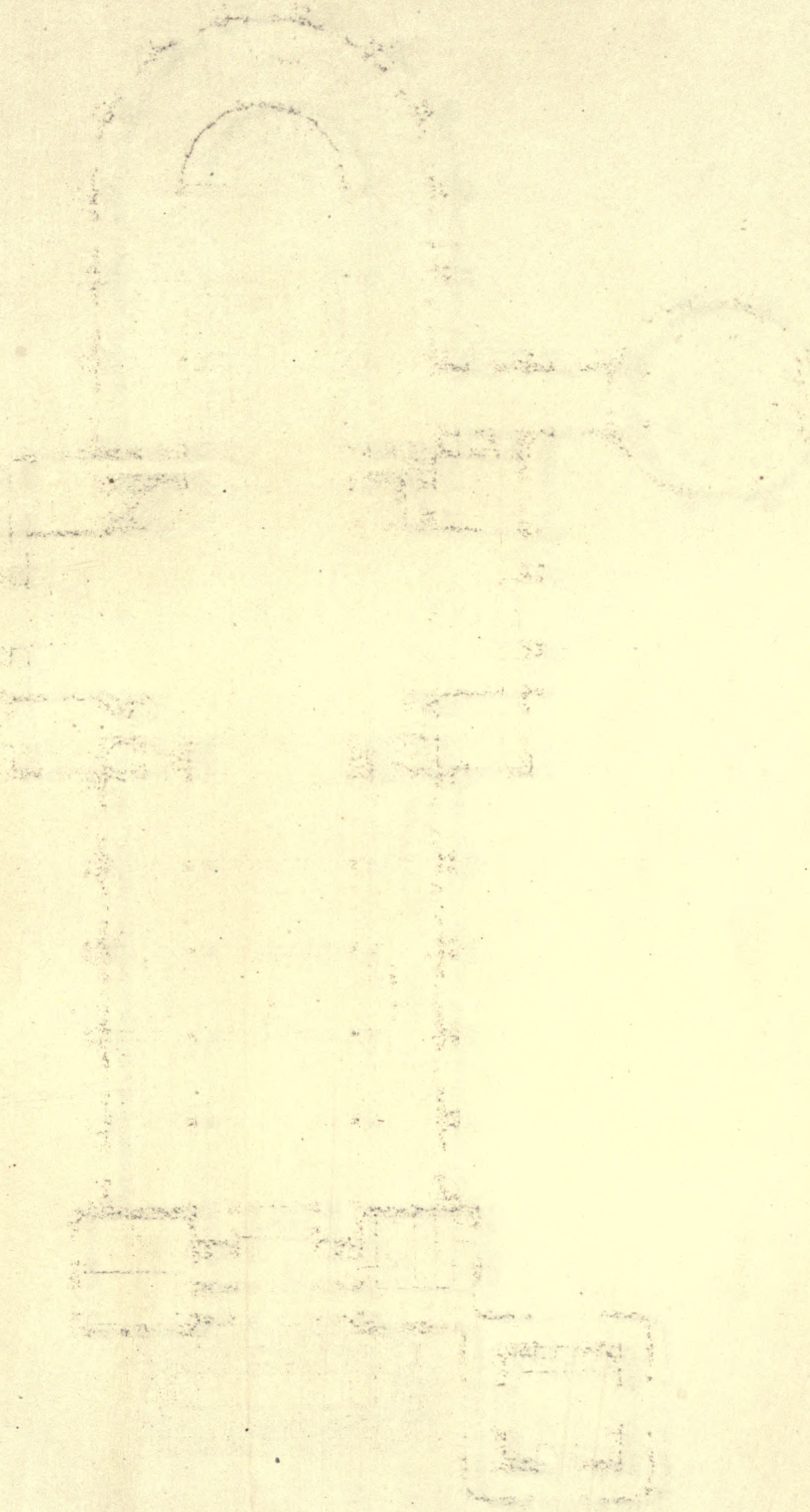
The Western Gallery was devoted more strictly to art in its applied form. Here we found furniture, textile fabrics, metal work, needle work, lace, etc., and this room was undoubtedly one of the most interesting in the exhibition. Commencing at the northern door we noticed the first (118) of a series of screens worked on holland in crewels and silk. They represented various kinds of grasses and were very nicely grouped and worked with a due regard for accuracy and color. The eastern wall was almost entirely filled with needle-work fabrics. At the southern end Messrs. Jeffrey & Co., exhibited a large collection of wall-papers mostly designed by Mr. Lewis Day. The large patterns are greatly in favor and many of the designs are of great beauty though the coloring in some appears just a trifle *outré*. There seems to be a danger of the designers of wall-papers lapsing into a sort of eccentricity and forgetting that the prime object of the paper is quite subsidiary in its nature, that therefore the designs and colors should be essentially quiet and subdued. A wall-paper that attracts attention for itself by a departure from this rule might well be charged with an offence against the canons of taste.

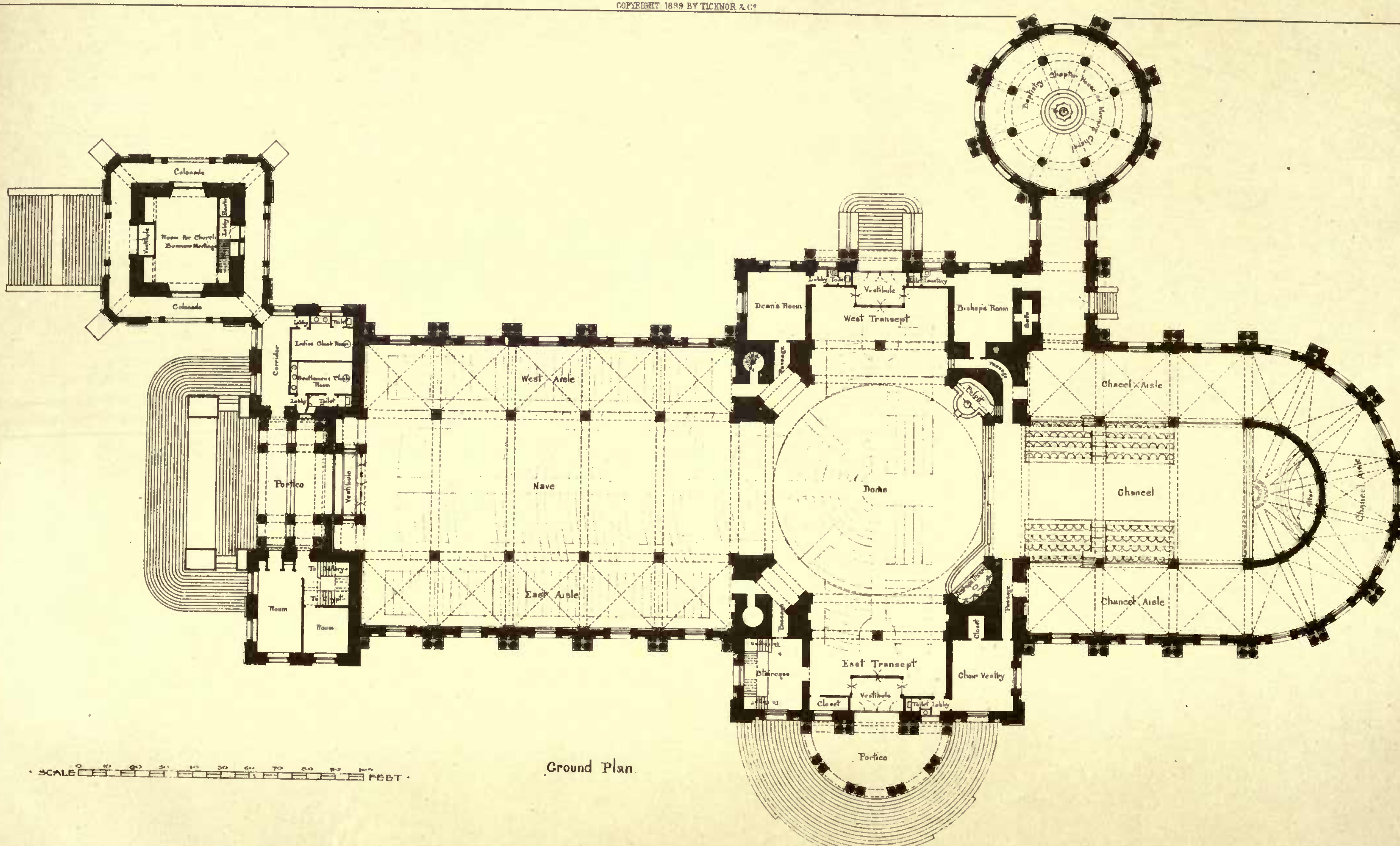
A carefully undesigned side-board in mahogany and gun metal (174) by Reginald I. Blomfield, occupied a portion of the southern wall. It was simple and graceful and not overloaded with ornament and the hinges and fastenings were well worth study. The row of candlesticks on the little columns in the centre of the side-board did not, however, seem very happy in its arrangement.

Messrs. Hindley & Sons exhibted (180) a pine panelled chimney-piece, white enamelled, with yellow upholstered seats, which does not seem quite the most suitable treatment for a fireplace! At either side is a little column the form of which cannot be too strongly condemned. At the foot it partakes of the nature of a cinerary urn with imitations of handles — perfectly useless, by the way — this merges into a sort of quasi-Ionic columnet, fluted about half-way down — forming about as eccentric a combination as one would wish to see. Of course, we do not expect to find pure detail in furniture, but there is a limit even to eccentricity. Singularly enough, the furniture was the weakest part of the Exhibition. What was there to call for commendation in the large oak cabinet (199)? And, with regard to the music cabinet in cedar and walnut (267); although the decoration of the panels was, *per se*, excellent, yet it is indeed difficult to say much in favor of the general design. The music-cabinet in yellow deal stained with crimson (23) was better. Here a lot of shelves are arranged each labelled with the name of an eminent composer, and the design of the piece of furniture, though far from perfect, deserves a better material than stained deal. The shelves, by the way, ran very uneasily, and one or two were already split owing to the use of unseasoned wood.

Space necessitates but a hurried glance at the remainder of the room, and I can only mention the following, Lectern (226), I. R. Spence, notable for the extreme disproportion in character between the ultra-heavy base and the light—almost flimsy beaten brass-work at the top of the standard. Designs for pastoral staffs [? staves](239) (247) J. D. Sedding, graceful and well thought out. Mrs. Anstruther Thompson's peculiar apliqué wall-decorations (240), reminding one strongly of stuffed children's dolls. The combination of talent in (241) Mr. Sedding's Holy Trinity Church, Chelsea, and the same artist's graceful and simple candlestick in brass and German silver (243). Mr. William Morris's carefully charming combination of colors in the fabrics on view on the Central Stand must conclude the account of this interesting exhibition which cannot but do an infinity of good in the sphere of action it has selected. Long may it live to do its noble work

S. J. PARKHILL & Co., Printers, Boston.

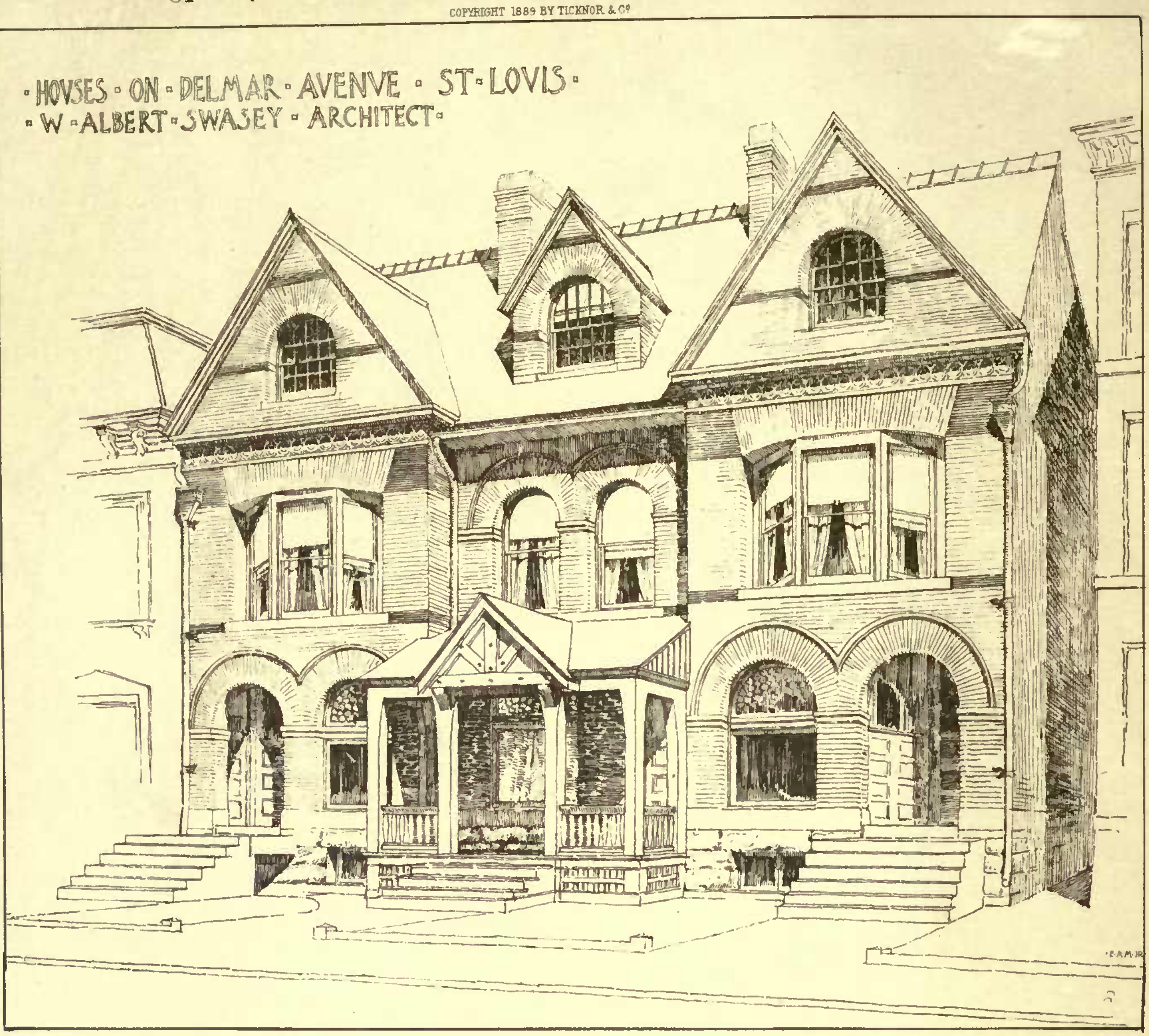


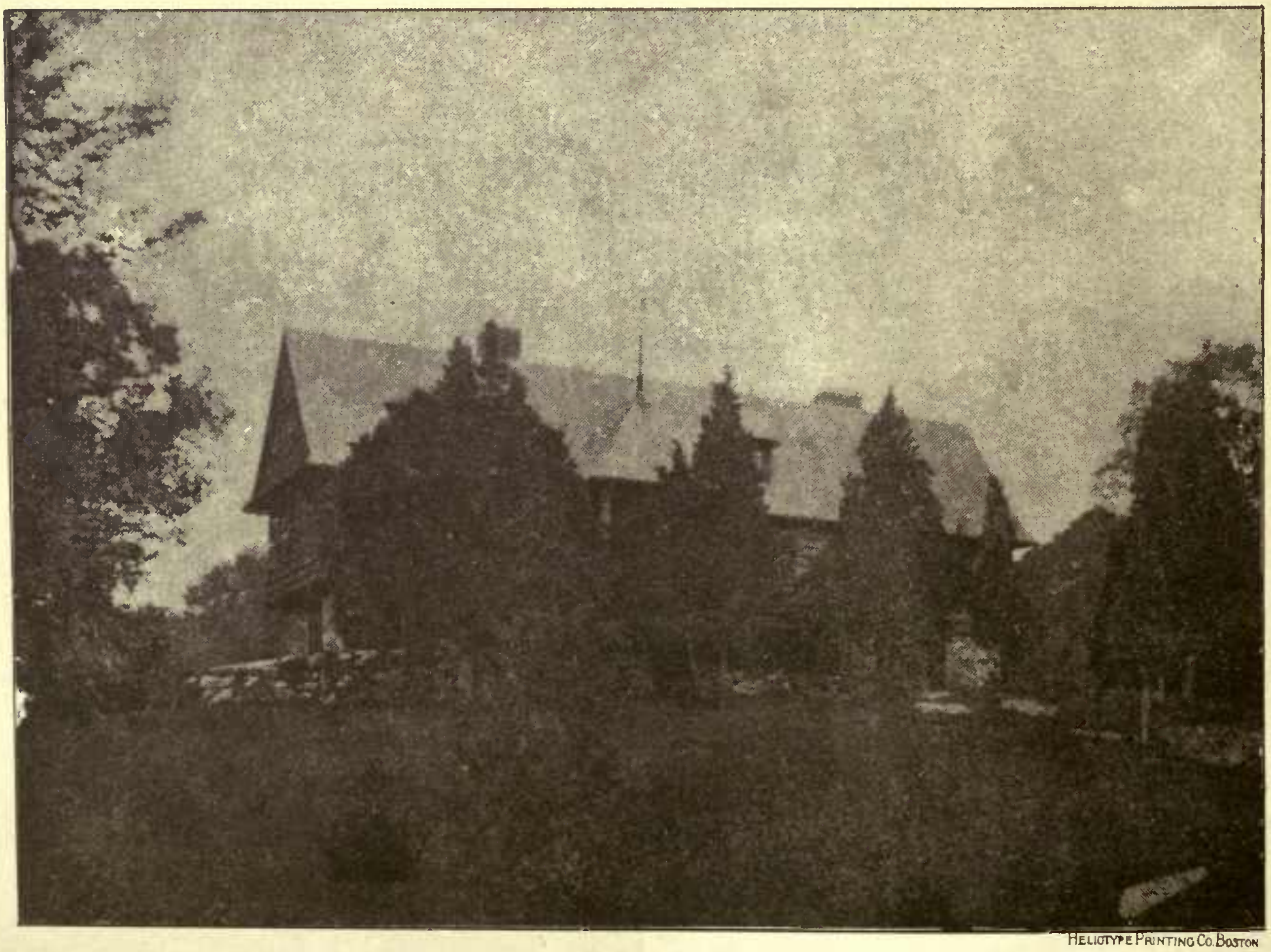


Ground Plan

Competitive · Design · for · the · CATHEDRAL of

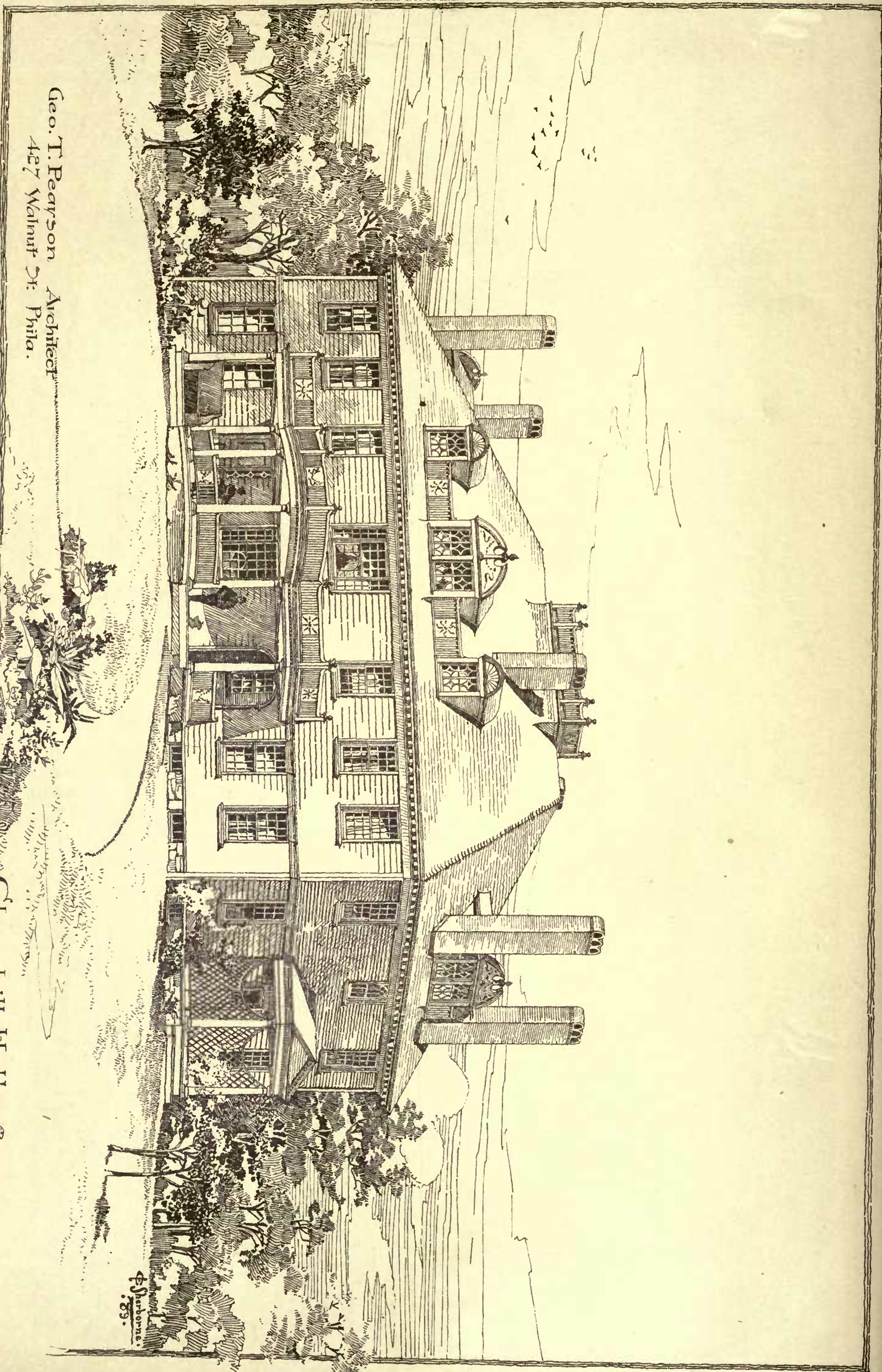
ALEXANDER HAY · ARCHITECT.





HELIOTYPE PRINTING Co. BOSTON

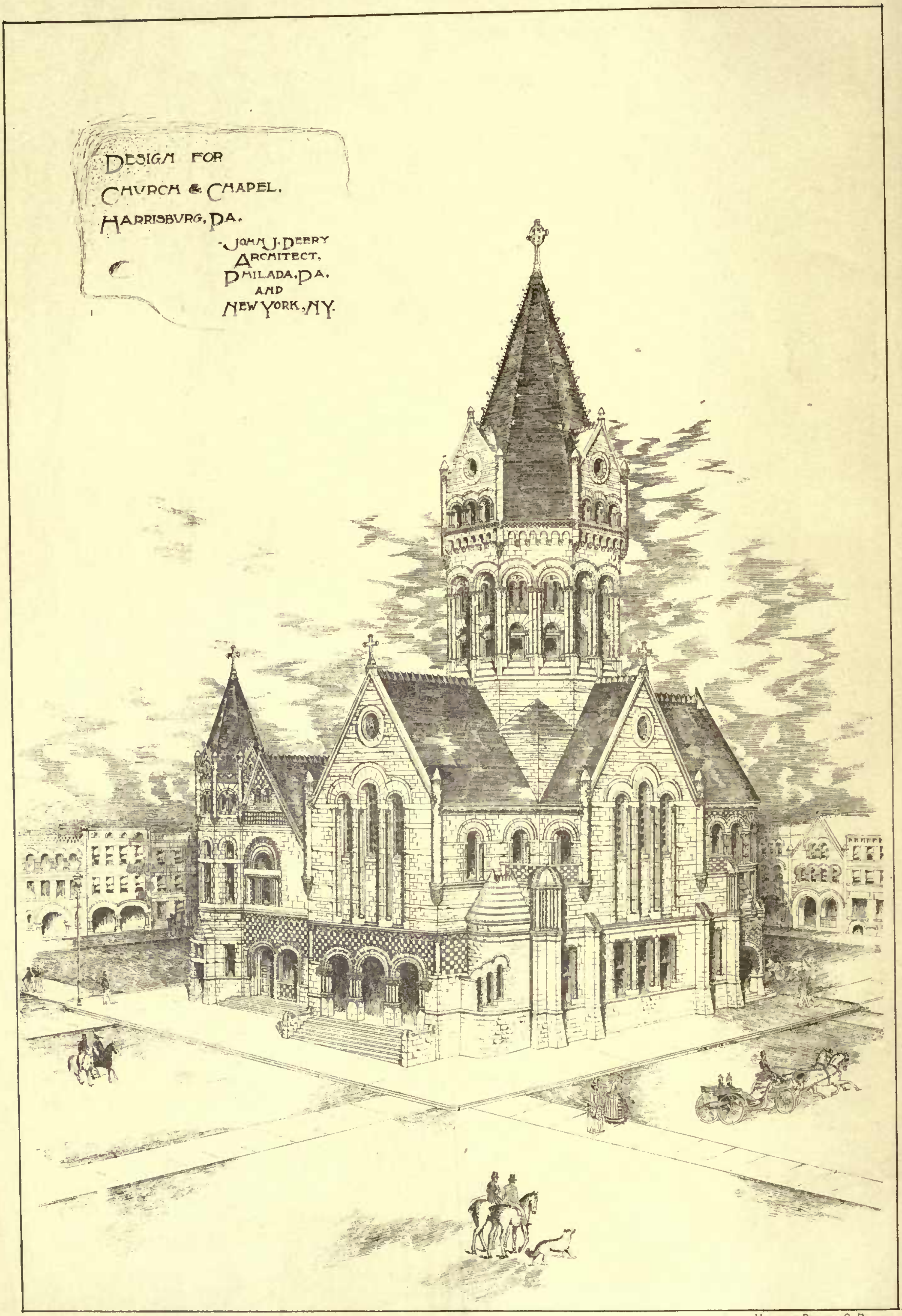
HOUSE OF HERBERT JAQUES ESQ. CHESTNUT HILL, MASS.
ANDREWS & JAQUES, ARCHTS.

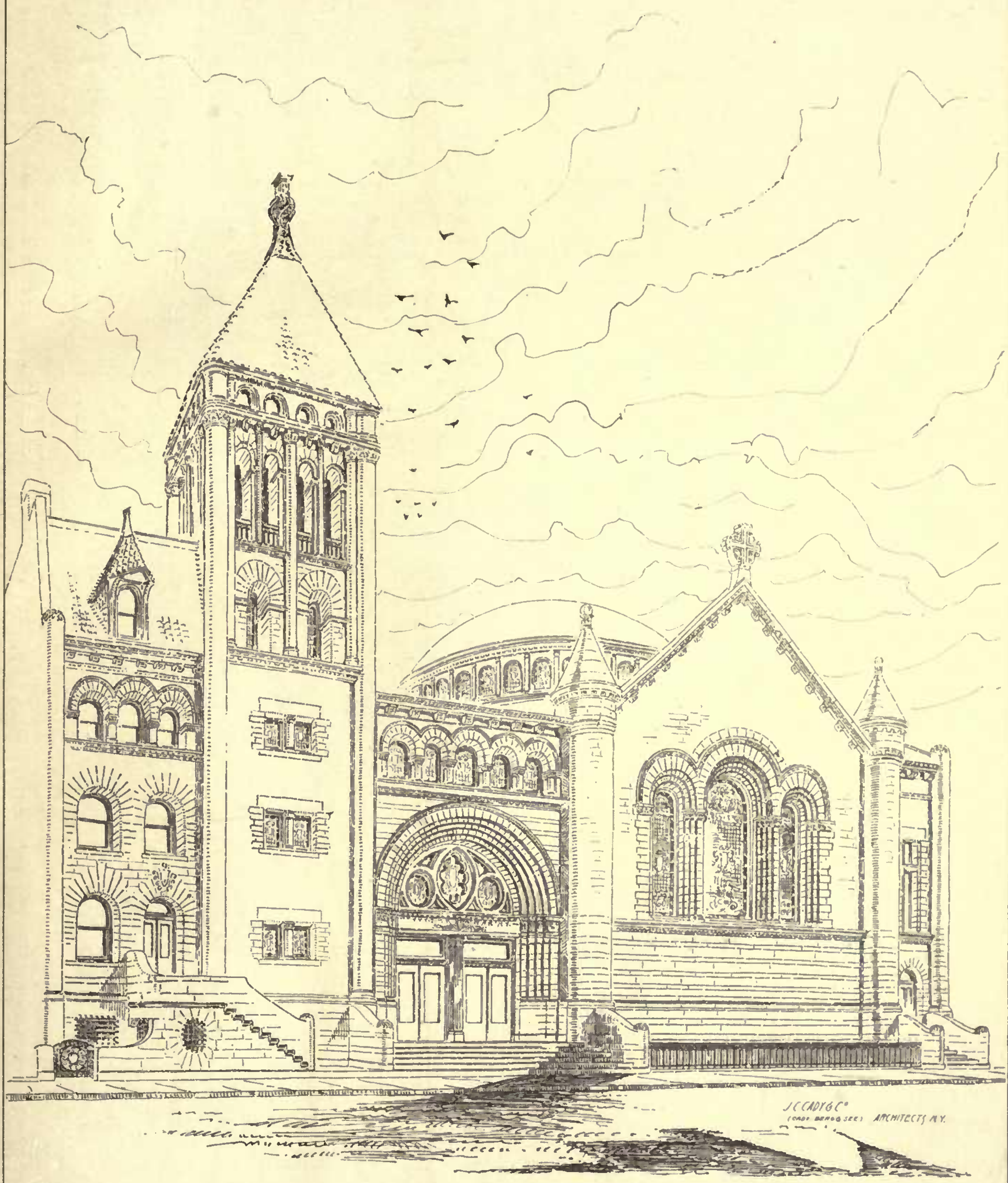


Churchill Hall, Whitemarsh, Penna.

Geo. T. Pearson, Architect
427 Walnut St. Phila.

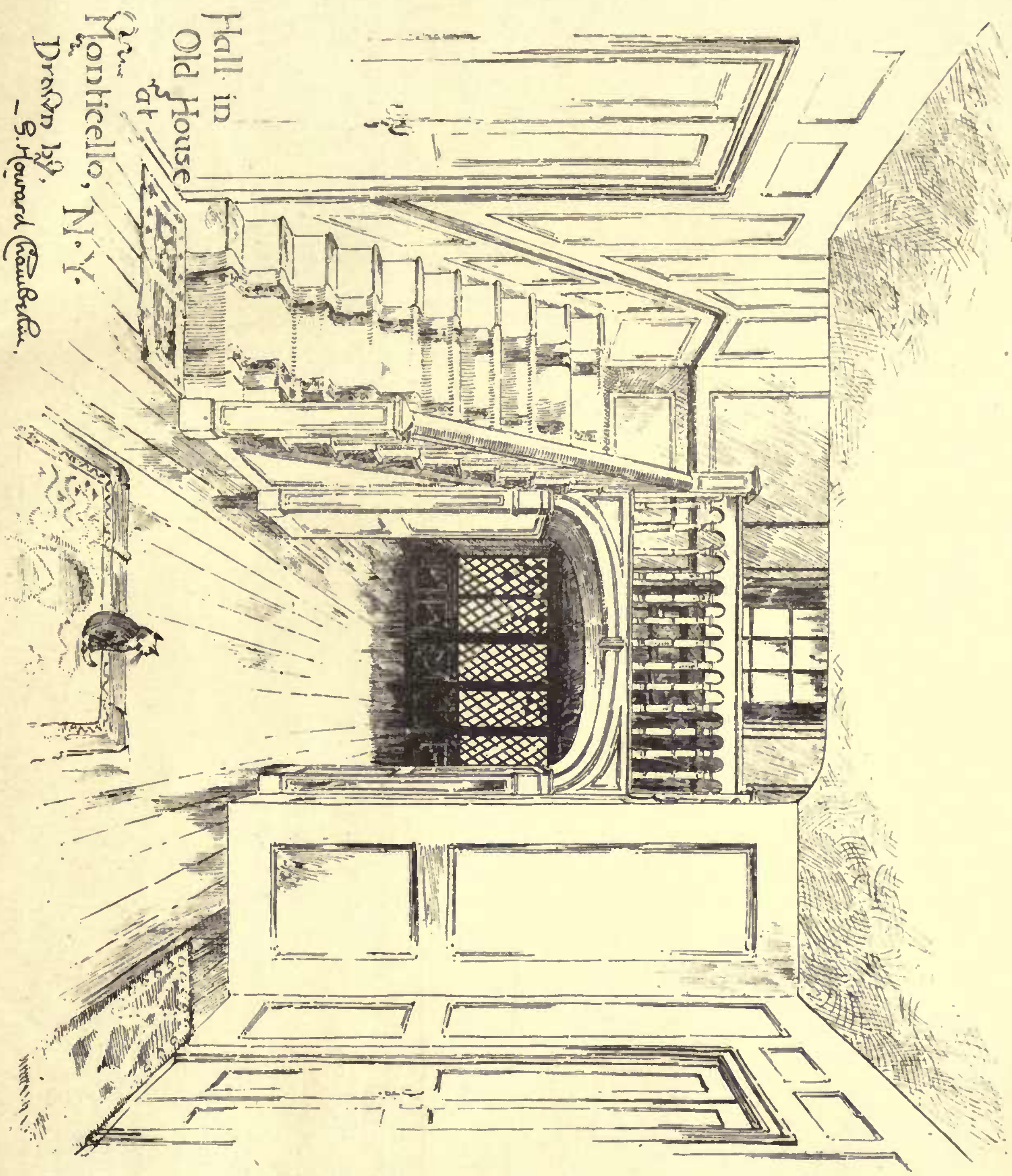
Heliotype Printing Co. Boston.


Design for
Church & Chapel.
Harrisburg, Pa.
John J. Deery
Architect,
Philada, Pa.
and
New York, N.Y.

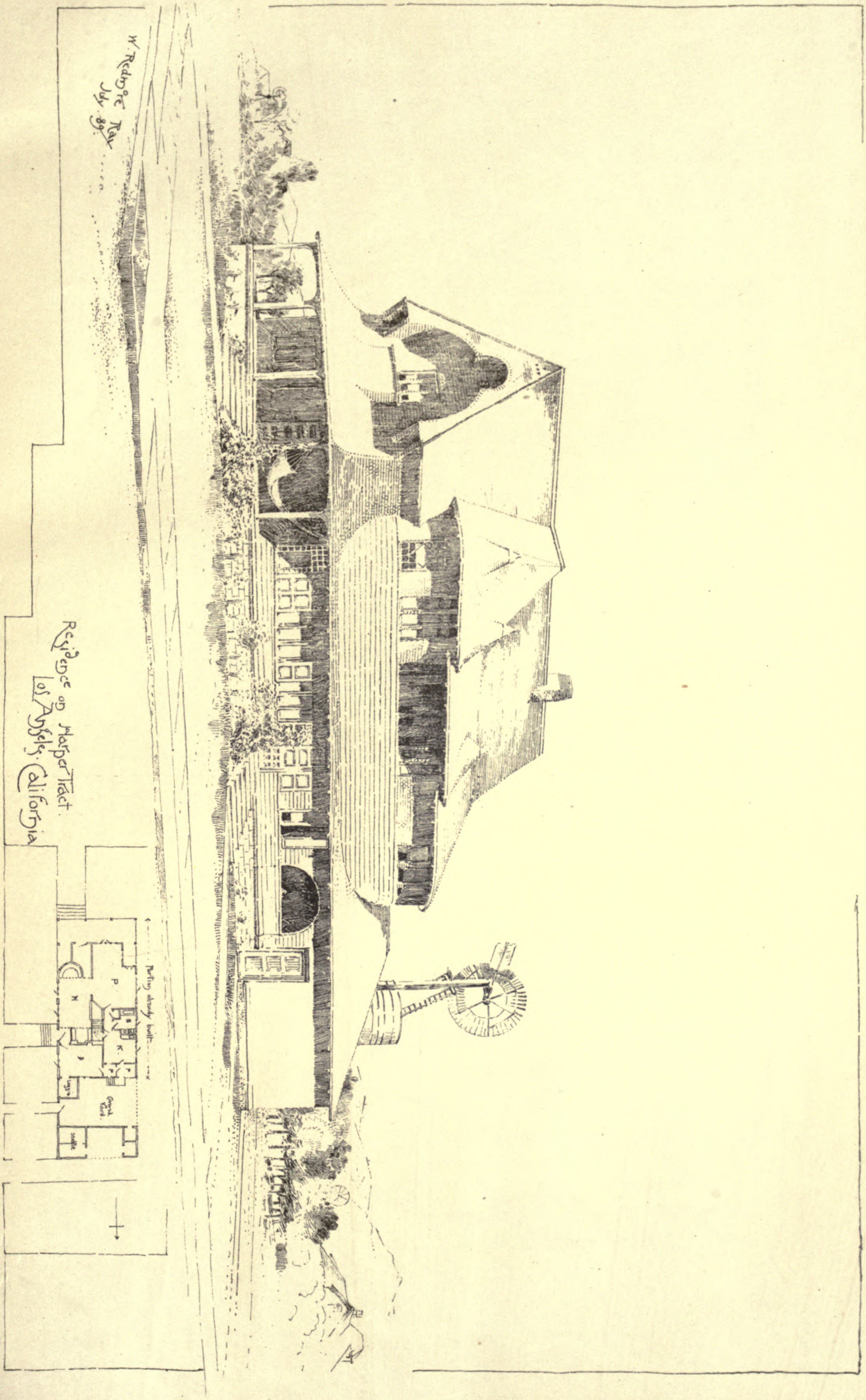


· ST. ANDREW'S METHODIST EPISCOPAL CHURCH · NEW YORK CITY ·

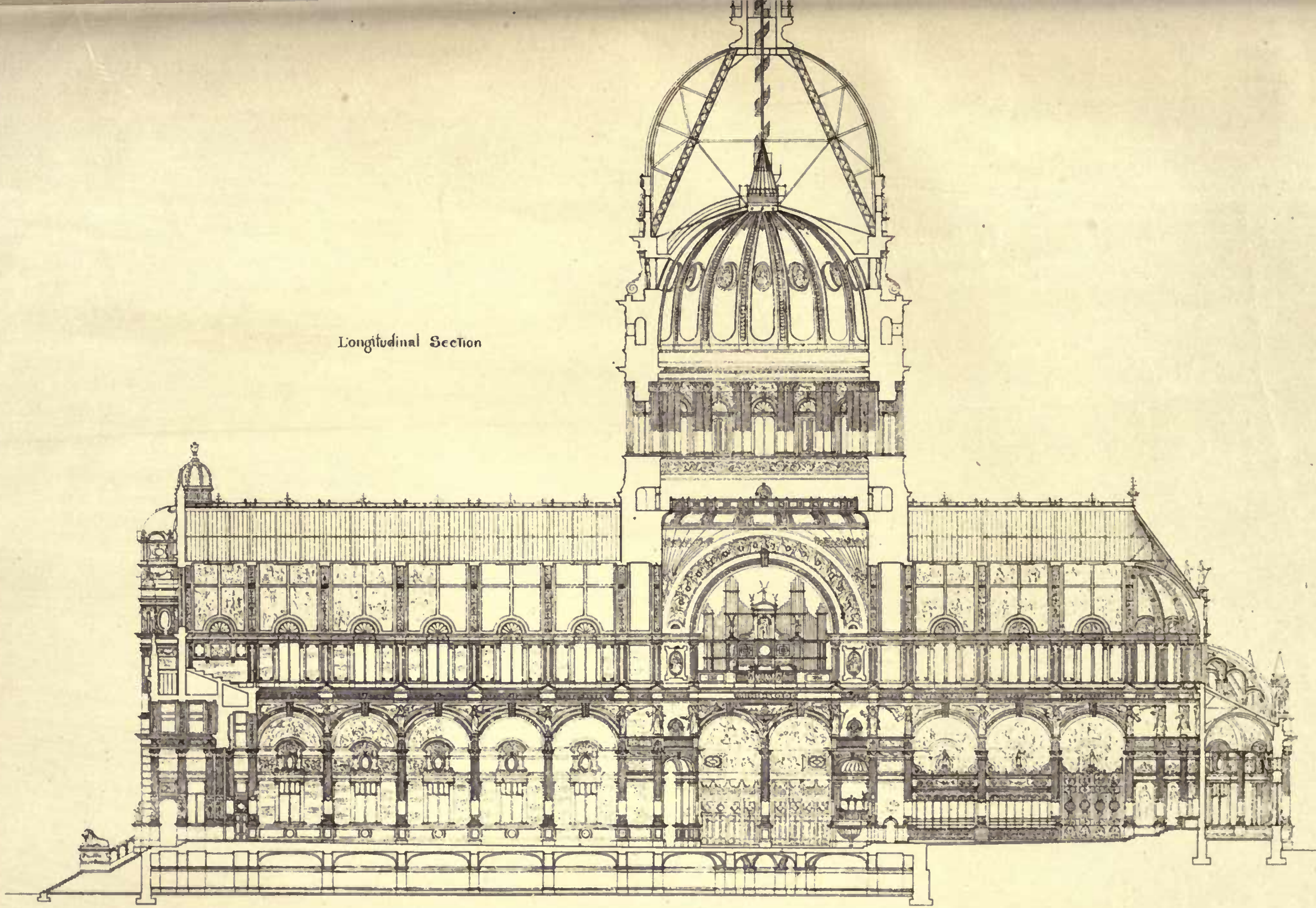
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Longitudinal Section

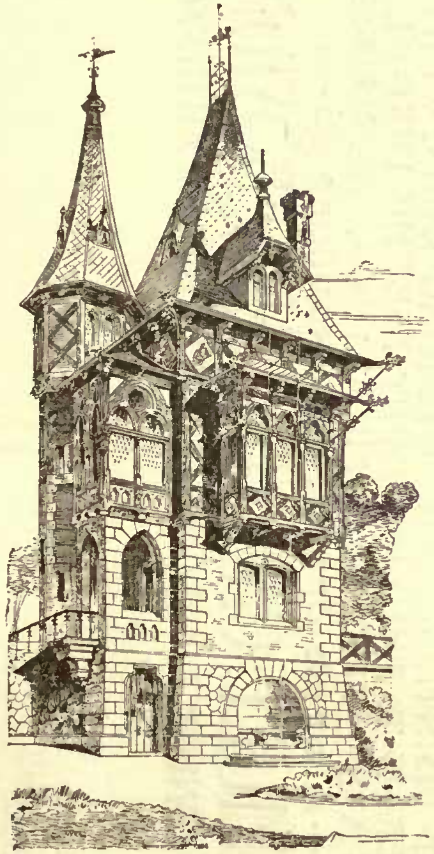
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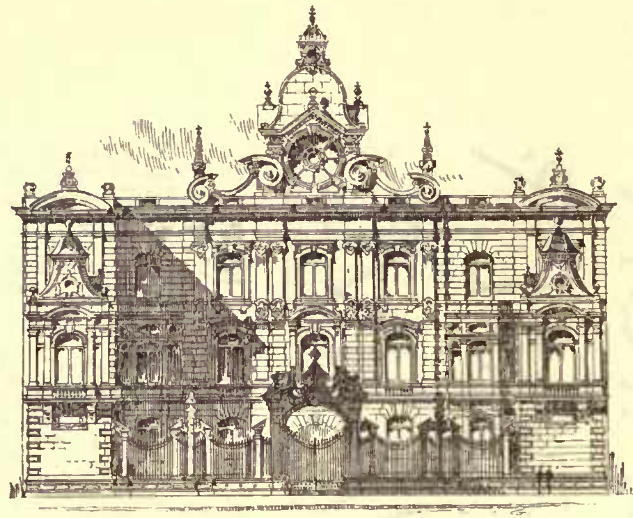


Heliotype Printing Co., Boston.

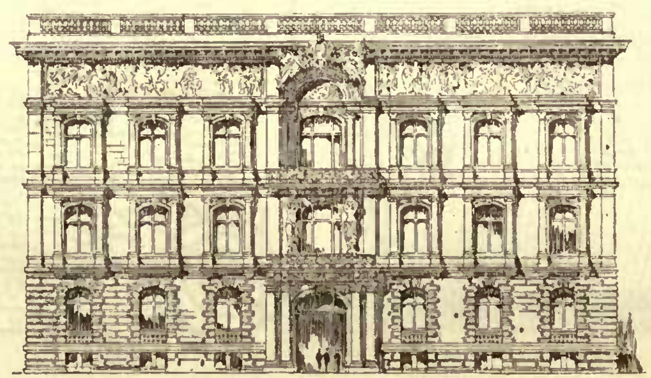
HOUSE OF HERBERT JAQUES, ESQ., CHESTNUT HILL, MASS.

ANDREWS & JAQUES, Architects.





Rear Facade of House of Herr Mosse, Berlin.



Front of House of Herr Mosse, Berlin.



GERMAN HOUSES.

THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 85. SATURDAY, JULY 6, 1889. VOLUME XXVI. No. 701.

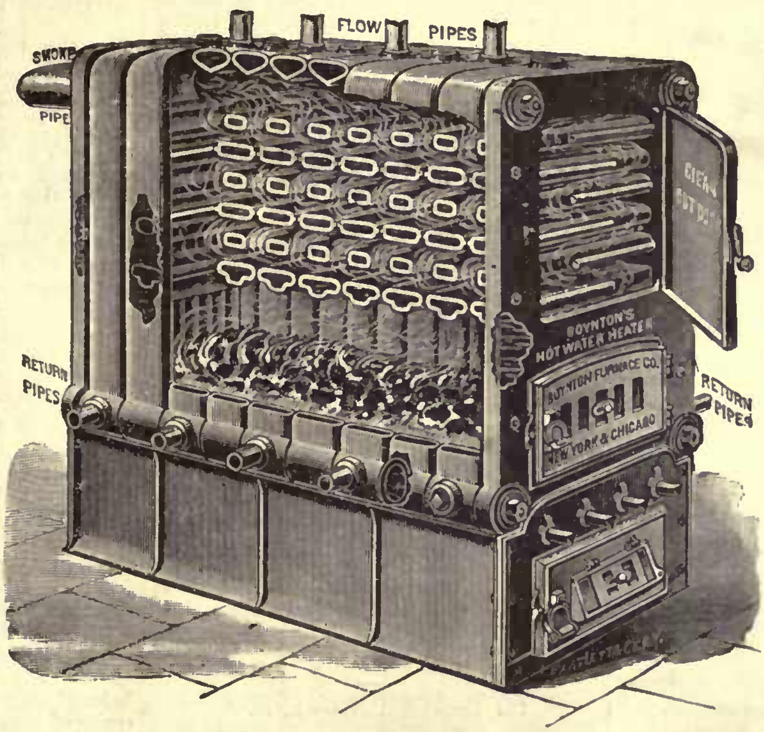
BOYNTON'S HOT-WATER HOUSE-WARMING HEATER.

THIS Heater is designed to combine the greatest possible amount of positive heating-surface with extreme simplicity of construction.

It has the advantage over other Water Heaters in the market in that the heating-surfaces may freely expand and thus obviate a frequent cause of breakage.

The surfaces are perfectly faced by machinery and bolted together through the water-ways, thus providing for an equal expansion of the sections of the Heater and the rods connecting them.

Boynton's Water Heater is the most economical in form, as the flames and gases of the fire follow the circulation of the water through the six continuous return flues, thus insuring long fire travel, and thereby exposing more boiler-surface to the direct action of the products of combustion, than in any other form of boiler ever introduced.



Convenient facilities have been provided for cleaning the flues by means of large clean-out doors in the front and rear ends of the Heater, thus rendering easy the removal of soot, which is known to collect on all hot-water and steam-boiler-flue surfaces.

When the sections are connected, the respective bases form a corrugated fire-chamber. This construction insures perfect combustion of the fuel, thereby dispensing with the use of brick linings, which are not only expensive to replace but form a lodgment for clinker matter. The fire-chamber of this Heater can be easily kept clean and free from all accumulation of soot and ashes.

It has a large ash-pit for the removal of ashes and is fitted with triangular revolving grates, specially constructed to insure great durability and ease in management.

It is portable in form, does not require any brickwork and can be placed with entire safety in any convenient location.

Boynton's Water Heater is so constructed that it can be set in batteries of two or more.

These Heaters have been pronounced by scientific experts to be the most effective, economical and of the best mechanical construction of any ever placed on the market, and as the best evidence of their superiority we will guarantee them to be satisfactory where all others have failed.

THE BOYNTON FURNACE CO.,
207-209 WATER ST., NEW YORK.

THE AMERICAN ELEVATORS IN THE EIFFEL TOWER.

IN a recent number of the *Pall Mall Gazette* is given an interview with the Paris agent of the Otis Bros., who describes the American elevators built by that firm to hoist the thousands who will want to ascend the Eiffel tower. The construction of the elevators was one of the most difficult problems the builders of the great tower had to contend with. The elevators had to go up the centre of the four columns, and before their junction these columns contain an incline and a curve. The straight part of the tower presented no difficulty; the incline could be got round, as it was not an unprecedented thing to run an elevator up an incline, but no one knew how to make an elevator describe a circle, at least not in France. The American elevator company, known in gineering, but in addition to a strong prejudice in France against foreign contractors there was a stipulation that no foreign material should be used in erecting the tower. After many futile attempts to find native engineering talent which would solve the problem of placing the elevators and not outrage national feeling, the commission had after all to fall back on Yankee skill. They did so reluctantly, and then only gave part of the contract to the American company; hence, there are three systems of elevators in the tower. To strike a radius of 160 feet for a distance of over 50 feet required a great amount of preparatory study and the American company worked on the problem for over three years. The first thing is the motive power. A cast-iron cylinder, 43 feet long and 38 inches internal diameter, is placed at the foot of the track, and contains a piston which moves up and down. Attached to the piston are Bessemer-steel rods 4 1-2 inches in diameter, which are connected at their upper ends with what the French call a chariot, consisting of wrought-iron girders supported on steel wheels, which move up and down with the piston. There are six pulleys in the chariot — each 5 feet in diameter — and cables pass round these pulleys; at the extreme upper end of the girders there are six similar pulleys, and cables pass round these pulleys in such a way as to form a "tackle" so that the speed of the piston is multiplied twelve times. This arrangement makes the car move twelve feet for every one foot the piston moves. From the chariot the 4 cables continue, always supported on pulleys, fixed onto an iron framework, down the other side, and are attached to the car of the elevator. The car is a large carriage of two stories supported by an iron framework and fixed on to the big steel wheels.

The distance between the rails is 12 feet 6 inches, and the carriage accommodates 50 persons, 21 in the lower compartment and 29 in the upper. It moves along an incline of 54° to the first story — a distance of 57 metres, or about 185 feet. Then it describes a radius of 160° and continues the inclined route

Any one of the six cables attached to the car is capable of supporting the whole weight, and there are all our usual safeguards, in case of accidents, adapted to the special construction of the elevator. A counterbalance, twelve tons in weight, runs on a track behind the car, and is attached to it by two cables. Six cables leave the car — two of them turn over to the right at the top, and are attached to the counterbalance, and the other four to the chariot. All the piston has to do, therefore, is to sustain the weight of the passengers, as the counterbalance lifts the car. The hydraulic pressure is secured from a tank in the second story, to which the water is pumped.

NOTES.

THROUGH the generosity of Mr. H. H. Houston, of Philadelphia, the new church of St. Martin's in the Fields, at Chestnut Hill, has recently been completed, from the plan of the architects, Messrs. G. W. & W. D. Hewitt. The church has been enriched by a metal pulpit, Eagle lectern and altar-rail, executed by Messrs. J. & R. Lamb, of New York, from the architects' designs. This work deserves more than mere mention, from the intricacy and elaborateness of its character, all of it being of heavy wrought and chased-metal. The pulpit has an octagonal marble base, above which rises an intricate interlaced series of panel-work in metal. In the lower part are groups of Greek Crosses with foliage, while above an open arcade continues entirely around the octagon until it is terminated at the right-hand side by a foliated hand-rail. This seems the best arrangement for a screen of metal, giving as it does in the lower part the larger mass of work which prevents the speaker's feet from being seen, while the more open upper part allows the greater freedom of action.

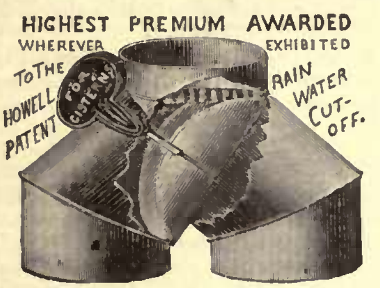
THE attention of architects and the building trade generally is called to the "Kinnear" Patent Metallic Ceiling, manufactured of sheet-steel. These ceilings make a building fireproof at a very little expense. They are ornamented with panels, mouldings, etc., and can be decorated and painted in colors to suit.

No joints are seen nor nail-heads exposed; it is dust-proof, clean, light, durable, inexpensive, reduces insurance and can be applied not only to new buildings, but old buildings as well. It is all that it is represented to be, and suitable for stores, office-buildings, hotels, churches, school-houses, halls, or any good buildings, and is being used extensively in Pittsburgh, Chicago, St. Paul, and other Western cities by leading architects. For further particulars and estimates, address J. S. Thorn, Twelfth and Callowhill Streets, Philadelphia, Pa.

The Elgin National Watch Co., Elgin, Ill., have awarded a heavy contract for electric lighting to the Edison Co., and their power-plant, consisting of two 200 horse-power, and one 75 horse-power engines, to Westinghouse, Church, Kerr & Co.

HOWELL PATENT RAIN-WATER CUT-OFF FOR CISTERNS.

THIS appliance is used for turning water into or off from the cistern. The cut shows all the pipes as being round, it having a portion of the shell removed, in order to show plainly the working of the bucket, or valve. The handle, which is an iron weight, insures the bucket remaining where placed, and entirely prevents it being turned by the downflow of water. It is shown in the cut as being on the left side, therefore throwing the water down the left branch. By merely turning the handle to the right side the flow of water is changed in that direction. The bucket or valve passes



behind the rim at the top and overlaps the bottom, thus securing perfect water joints at both connections. The down-spout of the building enters the top rim of the Cut-off, one of the lower branches leads to the cistern, whilst the other can be arranged to convey the water into the waste pipe or gutter as desired. By this simple contrivance you are relieved of the annoyance of slip-joints, loose elbows, getting wet, etc., etc. It will readily be seen that a child can manage it, and there is no chance for it to get out of order. Besides, it is the cheapest, and I boldly say, the very best article for the purpose ever offered to the public.

It is made either of tin or galvanized-iron; is light, cheap and durable; can be used in any position (with or without extra pipe), and does not splatter the water all over sidewalks, but directs the flow wherever desired. Special attention is called to the material and workmanship. I manufacture all sizes from two and one-half to twenty-four inches.

Packed in crates of one dozen each size up to five-inch, five and six inch in crates of one-half dozen each, F. O. B.; no charge for crates. For sale by dealers all over the United States.

G. W. HOWELL,
Manufacturer,
COVINGTON, KENTUCKY.

WILSON'S BLINDS, ETC.

MR. J. G. WILSON, of 907 Broadway, New York, has recently issued a catalogue of inside and outside blinds, shutters, rolling partitions, etc., of especial interest to architects, builders, and all contemplating building.

Wilson's Rolling Venetian Blind is handsome, durable, and artistic; it takes the place of the cumbersome folding blind (always unmanageable), obviates the studding out and boxing, and while thus securing a great deal of extra space in the room, is very much more convenient in operation, and presents an appearance unequalled by any other known piece of window furniture.

All his rolling Venetian blinds are now strung upon a galvanized-steel cable of seven strands, which is manufactured especially for him, doing away entirely with the single strand of wire which was formerly used, and making the blinds ten times stronger.

They are warranted to stand rough usage, and if any break inside of five years he will re-make them free of cost.

WILSON'S IMPROVED FIREPROOF VENETIAN BLIND.

The slats of this blind are made of metal, crimped or corrugated, to give them the necessary stiffness; they are enamelled in any desired shade or color, which, by a new process, is rendered indestructible.

Hung upon Wilson's Patent Metallic Ladders, this blind is made perfectly fireproof, and is certainly the cheapest and probably the only fireproof Venetian blind ever offered for sale.

The slats and the ladders will be finished to correspond, and to harmonize with the decorations of the rooms for which they are intended.

Exposure to weather does not injure these blinds in the least, and time has but little effect upon them.

These valuable qualities, their cleanliness and neatness of appearance, make them peculiarly suitable for hotels, hospitals, schools and public buildings.

The metallic slat is not new, having been used in England very largely for the past ten years. It is now, however, for the first time fitted with a metallic hanger, thereby greatly increasing its usefulness and value.

WILSON'S PATENT ROLLING PARTITION AND BLACK-BOARD COMBINED.

It is made with one surface, perfectly smooth and even, the joints between the slats being scarcely perceptible. The steel bands upon which the slats are threaded are placed about eighteen inches apart, and are anchored to strong spiral springs in the base board of the partition, as shown, thus keeping the joints between the slats perfectly tight, and preserving an unbroken surface, while at the same time admitting of ceiling or rolling up with ease.

The following are a few brief extracts from a very interesting article by Robert T. Bonsall, in *The Sunday School Times*, of February 23, 1889:

"It is not difficult for any one to see that there are serviceable ways of using the black-board in the general school session."

"A simple use to which the black-board can be put is to place upon it the outline maps of the countries about which our lessons are. You will find it both an easy and profitable exercise to enlist your scholars in this work."

"Frequently the lesson can be made much more forcible by some illustrative story, the impressiveness of which can be greatly increased by the use of the board."

"One of the editorial writers in *The Sunday School Times* recently said, 'Of all the mechanical appliances in the Sunday School, none can be of more use than the black-board.'"

"When the black-board is used intelligently, as a means, and not as an end, it certainly is a mighty instrument for good."

The reverse side of this partition is finished in hard oil, in the natural wood, presenting a very handsome appearance.

WILSON'S PATENT ROLLING STEEL SHUTTERS AND DOORS.

The double edge formed by Wilson's Patent Shields, prevent the wearing away of the edges of the shutter, caused by friction in the iron grooves, entirely obviating the objection that has justly been made to this peculiar defect in the ordinary rolling steel shutter. It is a fact worthy of notice that a shutter thus protected with this simple device will not only last many times longer than any other make of shutter, but will operate with greater ease and less noise. The friction being only upon the shields, is reduced to less than one-half.

J. G. WILSON.
907 BROADWAY, NEW YORK, N. Y.

The Booth Brothers & Hurricane Isle Granite Co., of 60 Bank St., New York City, are supplying the granite, and executing the mason work of the new Albany reservoirs, under the personal charge of Mr. John Donaldson, the Secretary, who reports the work well progressed, and that the same will be completed by, or before the end of the year. This work is being done in the most thorough manner, and when completed will be one of the most substantial public works in the State.

They are also building the granite work for the Rouss Building 549 to 553 Broadway, and have contracts for the State House at Augusta Me., the Court House at Fall River, Mass., the U. S. Post Office and Court House, at Key West, Florida.

THE BROCKTON SHUTTER-WORKER.

Patented Dec. 2, 1884, Oct. 13, 1885, and June 8, 1886. The simplest, cheapest and best device for the opening and closing of outside blinds from the inside, locking them on inside, firmly in either position.

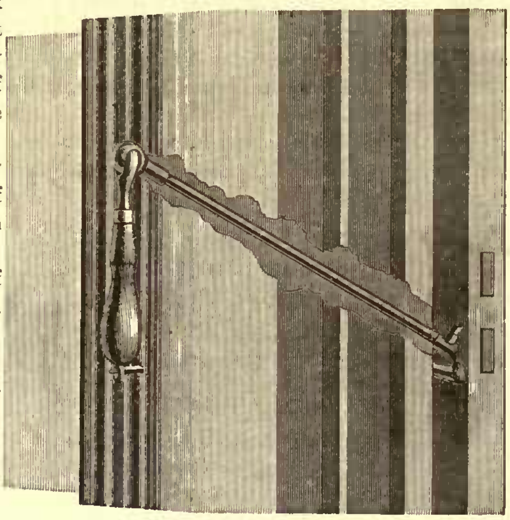
Hundreds of inventors have puzzled their brains for years trying to invent some device for handling outside blinds from the inside of the house, that would be practicable and at the same time cheap enough to bring it within the means of all — thus to insure its coming into general use. The Brockton Shutter-Worker fills the bill completely, it being simple, cheap, durable and effective, handling a blind with perfect ease; altogether the simplest and consequently the best fixture for the purpose ever invented. It opens, closes and locks the blind from the inside without raising the window, screen or curtain.

The blinds cannot be opened from the outside any easier than a locked door; a very desirable fixture on this account. On hot nights by closing and locking your blinds, to prevent intrusion, you can leave your windows open without fear. It will save its cost in screens in a few years. It cannot freeze up

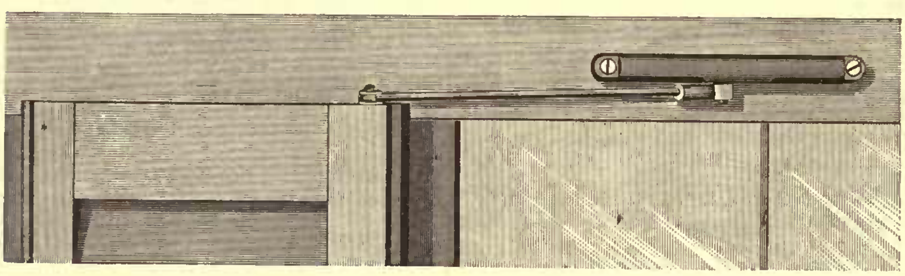
so that it cannot work, as it clears itself from snow and ice. It will save its cost in fuel, also, in a few winters, as by closing the blinds on the windy side of the house they keep out an immense amount of cold.

Blinds can be easily detached for painting without removing any part of the fixture. It does away entirely with the ordinary fixture.

Cut 1 shows the inside drop handle of worker, also the position of rod through the jamb casing or pulley-stile, the blind being wide open. The handles are made of nickel-plated metal and wood combined and are about five and one-half inches long. The wood parts are made either ebonized or stained dark-red — or made to order from any kind of wood desired, for which extra will be



1



2

charged. The handles as we make them (ebonized or red) look well with most any kind of finish. The workers are made of the best material and warranted.

To apply the worker the only cutting required is the boring a seven-sixteenths of an inch hole through the pulley-stile, edgewise, at an angle of thirty degrees, in the inside end of which is driven a bushing, one end made into a socket in which the ball on end of rod rests. By using a bushing we are enabled to fit any shape of moulded casing without any cutting or fitting. The outside end of rod is supported by an iron bearing fastened on with screws, or with a bushing which is used for the flush blind fixture. Bay-window blinds are even more troublesome than those on other parts of the house, on account of the necessity, in many cases, of using double or folding blinds. We make an automatic attachment called a "Folder" (see cut 2).

The "Folder" can be attached to blinds having the ordinary fixtures and are a great safeguard, as blinds cannot slam and be torn from their hinges where this is used, as is frequently the case without them.

Cut 3 represents our New Blind Hinge for blinds hung on the outside of casing. We claim this to be the best hinge for the money ever offered to the public; the hook fastens to the casing with screws and will never work loose as the driven hook invariably will.

Cut 4 represents our New Flush Blind-Hinge, being the lightest and neatest hinge for the purpose ever made.

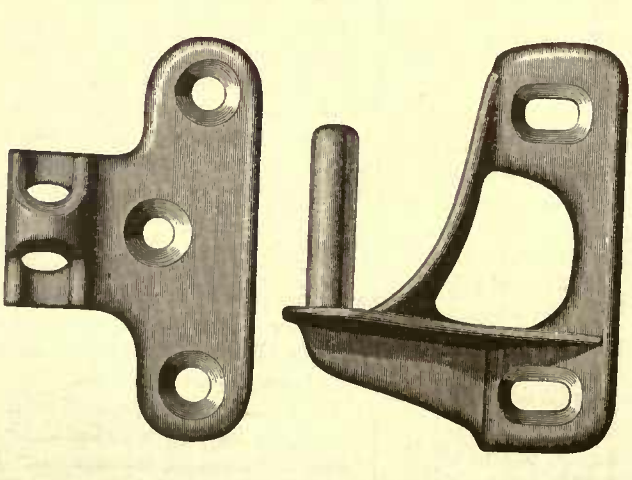
Our hinges are made of malleable iron, and are packed in 100-set lots.

Parties ordering Shutter-Workers for a new house should use our hinges, as they are especially adapted to work together.

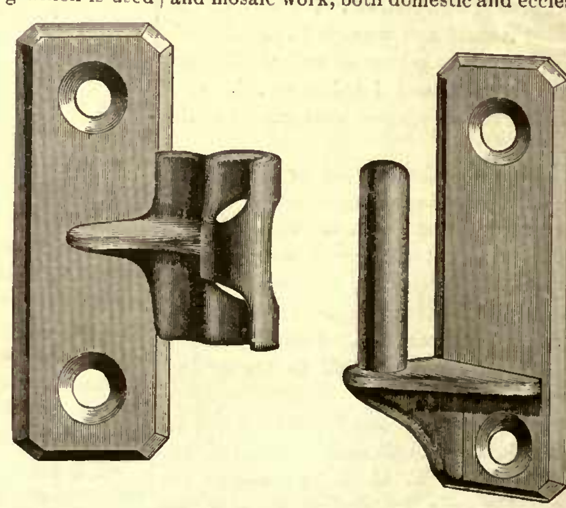
TYLER MANUFACTURING CO.,
BROCKTON, MASS.

Attention is called to the advertisement of Comins & Evans in another column. Mr. Comins began business in this line in Troy, N. Y., about twenty-five years ago and removed to Brooklyn about twenty years since, where he has built up an extensive business in connection with his energetic partner, Mr. Evans. They lay in a thorough manner artificial stone sidewalks as well as asphalt, gravel or metal roofing.

Mr. W. J. McPherson has removed his office and exhibition rooms from 440 Tremont St., to the Pelham Studios, No. 44 Boylston St., Boston, where he will be pleased to show designs and examples of decorative leaded glass and mosaic work, both domestic and ecclesiastical, and receive orders and estimate upon all kinds of interior and exterior painting and decoration.



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THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

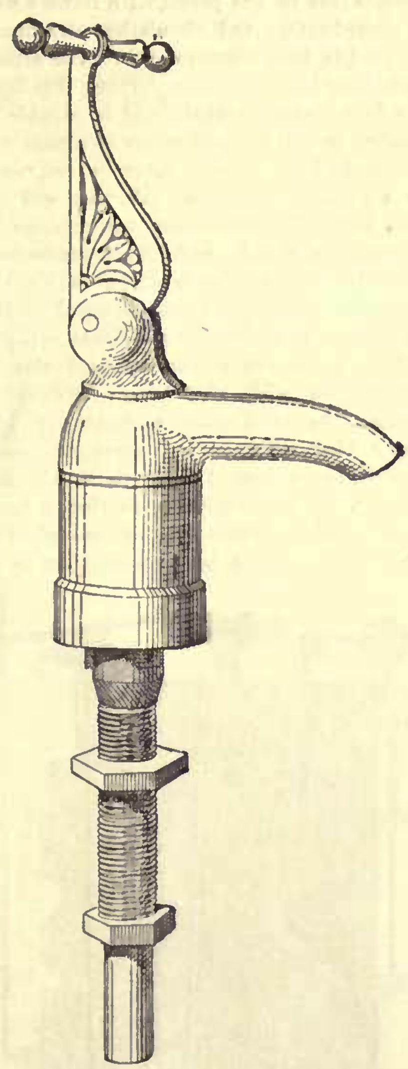
No. 86. SATURDAY, AUGUST 3, 1889. VOLUME XXVI. No. 710.

THE PRINCIPLE OF THE SANITAS SLOW-CLOSING FAUCET.

THE cut shows the outward appearance of the Sanitas Faucet. It will be observed that it is of the utmost simplicity and solidity in design. No packing is required around the valve-stem, and all the parts are heavy and durable. The valve closes with the pressure, instead of in the usual manner against it. Hence a comparatively flexible spring is used; and in virtue of this and of the peculiar construction of the handle, its use is so easy that a child can operate it with the slightest pressure. Moreover, the spring is never under heavy tension when the faucet is closed, so that it preserves its life indefinitely. With other self-closing faucets, the opposite is the case. The valve in these closes against the pressure; hence very powerful springs have to be used, which are extremely difficult to operate, and which constantly deteriorate under the permanent strain to which they are subjected. Moreover, in these common faucets the strength of the spring must evidently be greater than the heaviest water-pressure ever likely to be used on the faucet-valve, so that a considerable waste of power is necessary; and, since the life of the spring is gradually exhausted with age, and the pressure is liable to be varied in the water-mains, either permanently or temporarily, the faucet is certain to leak in time. Moreover, the wearing of the packing required around the valve-stem of ordinary faucets is a constant source of leakage and annoyance. In using them, it is necessary not only to exert a great strain of the fingers in overcoming the pressure of the heavy spring, but to sustain the strain during the whole time the water is running. This proves to be so very inconvenient (especially when, with hot-water faucets, the handle becomes so hot as to burn the fingers) that all kinds of devices are resorted to to tie the handle down, and thus the whole object of the device, for insuring against water-waste, is frustrated. When the handle is suddenly released, a severe shock is sustained by the recoil of the spring, which injures and sometimes bursts the water-pipes.

By the use of the Sanitas Faucet, all these very serious difficulties are entirely avoided. A slight touch of the handle, with instant release, is sufficient, with the exercise of very little power, to draw any desired amount of water, from a quart to a couple of gallons, from this faucet. The handle is in the form of a lever, and moves forward in an arc in the direction of the nozzle. Drawing the handle down through the complete quarter-circle, opens the valve completely, and gives the whole amount of water for which the faucet is originally adjusted when set. Turning the handle through a half or a quarter of this arc, gives correspondingly a half or a quarter of this amount of water, and thus a very great saving of water is effected, an advantage which the metered house-owner and the water-companies greatly appreciate.

Moreover, the user is enabled to make use of the water while it is running, and thus



avoid the annoying waste of time necessary with other self-closing faucets in holding the handle down.

A small adjusting screw is provided at the bottom of the chamber under the spring, by means of which the quantity of water to be delivered at each full opening of the handle is regulated when the faucet is set. It is best to regulate the amount by the capacity of the basin it serves, up to the overflow point. This faucet closes slowly automatically, and cannot hammer under the heaviest pressure ever used. Hence, there is no possible danger of swelling or bursting of pipes through its use.

The spring chamber is closed by a floating valve, which opens when the water is turned off of the house; and all parts of the faucet are then drained off, rendering damage by frost impossible.

Instead of packing around the valve-stem, the principle of water-suction is employed in this faucet to make it tight. This principle is far more simple and satisfactory than any other, and does away with all injurious wearing of parts. In short, the whole apparatus is practically indestructible, the only parts which ever have to be renewed being the leather washer at the valve-seat. Even this is evidently far more durable than in other self-closing faucets, because the closing of the Sanitas Faucet is slow, direct and soft, and does not come to its seat with the turning or grinding movement, so common in other faucets, which causes their washers to be quickly cut away at the seat.

THE SANITAS MFG. CO.,
207 TREMONT STREET, BOSTON, MASS.

BARDSLEY'S PATENT WOOD DOOR-KNOBS.

THE use of wood door-knobs has become very general within a few years, and very justly so as they have a pleasant feeling to the hand and, if they are properly finished, are pleasing in appearance. The undersigned was the first in the field with this line of goods, and has confined himself to making only a first-class article which has proved as satisfactory to the user as to the maker. It is a difficult matter to fasten a metal shank into a wooden knob to make it stay there permanently, but this is effectually done by means of the patented device which he employs, making an absolutely sure thing of it, not one knob fastened with it having come loose. This gives him a great advantage over the imitators who have sprung up, who have no other way than simply to screw and glue the shank into the knob; these hold perhaps for awhile, but after a time the wood shrinks a little and the knob-heads come off in the hand. Architects are warned that these worthless imitations are continually being supplied where the Bardsley Knob has been specified. Only two weeks ago a well-known architect complained to us that the knob-heads were coming off in two flats where he had used them. Upon investigation we found that these cheap imitations had been used, and so reported to the architect, who at once ordered all the knobs to be taken off and returned to

the hardware concern that furnished them, and the genuine goods substituted. To protect the users and ourselves against these miserable imitations, hereafter the name BARDSLEY will be stamped upon the shank of every knob, so that the architect or builder can, by a slight examination, ascertain whether he is getting the genuine goods or not. Every knob so stamped is fully warranted.

J. BARDSLEY,
59 Elm Street, New York.

THE HENDERSON HEATING-SYSTEMS.

In our climate for a large portion of the year the system of heating applied to our dwellings and public buildings has more to do with health and comfort than almost any other important appliance of modern life. In the heating-system is involved ventilation and the proper supply of pure air to the closed rooms of the dwelling, school or public hall. Where everything is adapted to its use the furnace is probably the best system, taking into consideration ventilation and economy. We present here the heating-systems made by Messrs. J. C. Henderson & Company, of Troy, N. Y. The first, Figures 1 and 2, for the use of hot-air, made to be set either portable or in brick walls. Figure 1 showing the



Fig. 1.

portable furnace encased and Figure 2 without the casing of sheet-iron. This furnace, known as the "Tubular Dome Furnace," is made in four forms and has large, strong and durable fire-pots. The domes and radiators are each cast in one piece without joints. The grates are large and easily cleaned. The ash-pits are deep, giving a large free space for ashes. The doors in the front are large, making the furnaces easy of access both to feed the fire and to clean out the ashes. The grate-shaft has a follower, so that when the grate is shaken the ashes will not flow out into the room.

The cast-iron radiator which is connected with the dome by a collar, compels the smoke and burning gases to travel around its entire circumference before it reaches the smoke-pipe or chimney, and thus adds a large amount of extra heating-surface. It also has wrought boiler tubes which are made steam-tight and run through the dome from points on the lower part to the top, which also adds very much more heating-surface.

The above represents the hot-air furnace made by J. C. Henderson & Company, and is well-calculated for use in places where the furnace will do the work; but there are cases where hot-air furnaces cannot fill the bill, as in broad-spreading houses or under other conditions in which heat cannot be properly distributed from a furnace. For this purpose the Hendersons have adopted a combined system of hot-water and steam with the furnace. To meet such cases Mr. Henderson

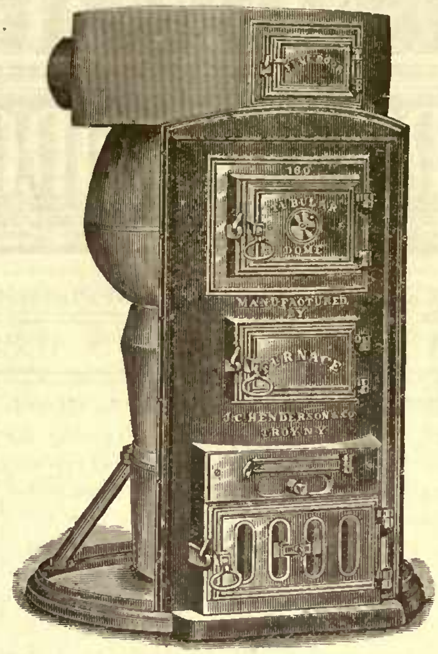


Fig. 2.

reports that he has perfected a furnace with a water-heating and circulating attachment adapted to heat conservatories. The attachment is added to the same furnace that heats the house with warm-air, and is capable of heating in this manner rooms of almost any size desired by carrying water to such rooms in a radiator and open tank, that will not only heat the conservatory but produce by evaporation a soft and humid atmosphere which is most conducive to plant-growth. The conservatory is thus rendered equal to any greenhouse at a moderate additional expense.

This improvement can be used also in combination with the hot-air system of heating, by conducting a steam or hot-water circulation to any room or rooms desired to be heated by radiation in this manner. It frequently occurs that a bath-room is so located that it is not convenient or possible to carry a hot-air conductor to it.

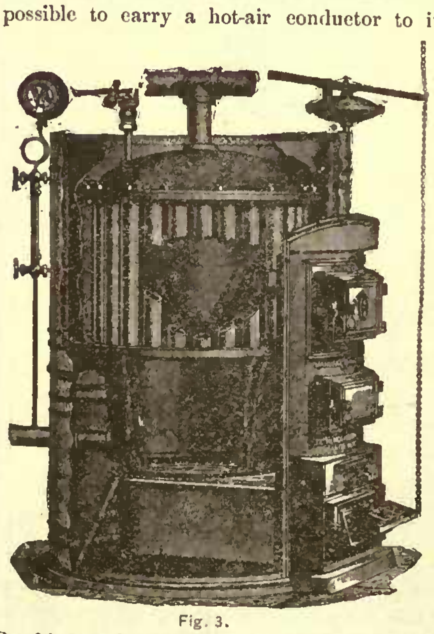


Fig. 3.

By this attachment the room may not only be warmed, but may also be supplied with hot-water in large quantities as well. This method is especially adapted to supply hot-air and hot-water to Turkish-baths. Such baths have been heated in this manner with the most satisfactory results, giving a large supply of hot-air for the heating-room, and at the same time, with the same fire, supplying all the hot-water needed for the bath or other purposes.

Figure 3 represents Henderson's steam or hot-water boiler for warming all kinds of buildings or conservatories in the manner above referred to, and will be found both effective and economical. It is made portable and brick-set, and in sizes ranging in capacity from 20,000 to 100,000 cubic feet of air-space. Mr. Henderson has given much study to the subjects of ventilation and the methods of heating by warm-air circulation, hot-water or steam, and in consequence the results of his experience as set forth in his circulars and catalogues will be found valuable and interesting to architects and builders. His methods of securing constant circulation of air, location of ventilators, etc., for private houses, public halls and other places are worthy of careful attention, and the system of heating adopted by him, embracing hot-air furnaces and boilers for circulating steam or hot-water, are well adapted to secure good results both in ventilation and heating.

The vital principle of heating by a boiler is the proper circulation of the steam or hot-water which is used to absorb the heat from the heating-surfaces of the boiler. The heating-surfaces of this boiler are so situated and arranged that they absorb the maximum amount of the heat generated by the burning fuel which they surround. You will be convinced of the truth of this statement by observing the cut, Figure 3, of the boiler referred to above, which shows that most of the heating-surfaces are so situated and arranged directly in the presence of the fire, that they receive radiant heat directly from the burning fuel which is at a high temperature. It is an established physical law that metallic-surfaces which receive direct rays from a source of heat maintained at a high temperature, as the burning fuel in a fire-box, will absorb and conduct many times as much heat as the same surfaces when shaded from the direct rays from the fire, and absorbing heat merely from contact with the hot-products of combustion which pass to the chimney, and the ratio of efficiency of the surfaces receiving direct rays from the fire increases as the temperature of the fire increases. Further, the circulation of the steam or hot-water is accelerated by the more rapid absorption of heat by the surfaces which receive direct rays from the fire which is obviously a result of the highest importance to the efficiency of the boiler.

J. C. HENDERSON & COMPANY,
Troy, N. Y.

BUSINESS CHANGE.

The Boston Branch Store of the Archer & Pancoast Manufacturing Co., at 12 West Street, Boston, will henceforth be known as Warren D. Kinny & Co.

Mr. Kinny who has been connected with the Company in New York for a number of years, became manager of their New England business in October, 1887, and meeting with unprecedented success, made the Company an offer for their Branch Store, which was accepted and the transfer made July 1, 1889.

Mr. Kinny's intentions are to continue the sale of artistic gas-fixtures manufactured by the Archer & Pancoast Manufacturing Co., and also benefit all parties interested in the furnishing of private or public buildings with gas-fixtures, lamps, fireplace furnishings, and

all kinds of metal-work in brass or wrought-iron, with a choice selection of the above goods from the various manufacturers, thus submitting to the public a much larger variety.

Mr. Kinny will continue to give the business his personal attention, and being intimately conversant with every requirement of the public in this direction of trade, has proved himself eminently successful in meeting promptly all its demand.

The spacious show-rooms at the above address are models of elegance, taste and beauty, the goods shown making a magnificent display.

The Newport residences of Mr. F. W. Vanderbilt, W. H. Osgood, Mrs. Wm. Gammell, also the Boston residences of Mr. Chas. Head, Mr. Chas. F. Adams, Jerre Abbott, Mrs. Chas. Blake, Alex. Cochrane, Col. Peabody, Chas. Kidder, W. F. Weld, H. Austin Whitney, Natl. Thayer, Hon. J. F. Andrew, H. C. Jackson, these with numerous other buildings of equal elegance, requiring ability and a thorough knowledge of the business have been furnished with gas-fixtures by Mr. Kinny.

It is such concerns that are acknowledged exponents of American capacity and enterprise.

WARREN D. KINNY & COMPANY,
Boston, Mass.

NOVELTY FURNACES.

The story of a hot-air furnace is told in a very few words. If a furnace has more heated surface in closer contact with the fire (consequently hotter) than any other furnace of the same size fire-pot; if these surfaces are perfectly self-cleaning and have a position which insures their prolonged durability, the furnace having them must be of greater superiority than any of its competitors. Such a furnace, the manufacturer claims, is the *Novelty*, advertisement of which will be found on page xi of this issue.

In addition to the features above mentioned they claim that the specially shaped fire-pot and the great weight and substantiality that the *Novelty* possesses combine to make it a furnace that covers thoroughly and completely all the essential points in a first-class apparatus, namely, prolonged durability, perfect cleanliness, great power and consequent economy.

Samples of these Furnaces can be seen at salesroom, 79 and 81 Blackstone St., Boston, 250 Water St., New York; 144 North Second St., Philadelphia, and 57 Lake St., Chicago. Send for description and testimonials.

BOSTON FURNACE CO.,
Manufacturers,
Nos. 79 and 81 Blackstone St., Boston, Mass.

KEIM'S COLORS.

It has been asked: "Why do not American painters take a progressive step toward the adoption of a system similar to that in vogue in Europe, notably Germany, for securing colors which will not fade?" In that country there exists an organization which is an association of prominent artists, who believe that the unchanged brilliancy and beauty of the works of the old masters was largely due to their having used colors of reliable composition and durability. It is known as the German Society for the Advancement of Rational Painting, of Munich, of which the eminent Prof. Wilhelm Lindenschmit is Chairman. These colors are known as "Keim's Normal Colors of the German Society for the Advancement of Rational Painting." They are prepared under the constant supervision of the Society; are ground very fine in oil, according to the formula prescribed; and are given such specific names as will enable every artist to thoroughly comprehend their nature and origin. It is reported that the tests made there have been very satisfactory, and a rather singular feature is that the sizes of the tubes are, in many instances, two or three times as large as those ordinarily manufactured. To all lovers of art, finely executed with the brush, there may be some wisdom in the suggestion to obtain standard oil-colors which will not vary in tone and quality, and which may retain their original newness on canvas for many ages.

TESTIMONIALS FROM A FEW OF THE ARTISTS WHO ARE USING KEIM'S COLORS.

No. 2 West Fourteenth Street,
New York, June 7, 1889.

J. Marsching & Co.

Gentlemen, — I have been using Keim's colors, and find them in every respect satisfactory. For purity and brilliancy they are unequalled by any other make I have used.

Yours respectfully,
Thos. B. Craig.

New York, June 3, 1889.

Messrs. J. Marsching & Co.

Gentlemen,— After having thoroughly tried the Keim's Normal Oil Colors, I feel it my duty to say that I consider them superior to all others.

The Cadmiums being the most pure and brilliant I have ever used, and the Ultramarines richest and most satisfactory.

I can recommend them to all who would use the most reliable colors.

Respectfully yours,
F. De Haven, 2 West Fourteenth Street.

New York, June 4, 1889.

Messrs. Marsching & Co.

Dear Sirs, — Having tried your "Keim's Extra-fine Oil Colors," I cannot say too much in their favor. There are no colors on the market to-day that can compare with them in any respect. Their brilliancy and body are of the very finest quality; in fact, I have never had the pleasure of using such excellent colors in all my long experience, and hereafter will use no other for my work.

You can feel assured that all my pupils shall learn of their incomparable qualities.

Yours, Carl Hecker.

3 North Washington Square,
New York, October 3, 1887.

J. Marsching & Co.

Dear Sirs,— I recommend unreservedly the Keim's Oil Colors. I find them pliable to the brush, taking kindly to the surface of the canvas, and *unequalled in purity* by any other make.

Yours truly,
Walter Shirlaw, N. A.

Keim's Colors are imported and for sale by
J. MARSCHING & CO.,
27 Park Place, New York.

THE ANCHOR BRICK.

I started in 1883 and have gradually increased my capacity from three to sixteen million a year, and have constantly endeavored to improve the quality of my product.

The Anchor Brick made by S. Hamilton, Jr., of Croton Landing, Westchester, N. Y., are largely used for facing factories, warehouses and mills; for building heavy piers and chimneys.

Furnished over ten million to new Croton Aqueduct. Also to Havemeyer's sugar refineries at various times. Have supplied brick to the following mills in Fall River, Mass., during the past year: Stafford's mill, for chimney and boiler-house; King Philip mill, faced with Anchor Brick; Hargrave's mill, built of stone, chimney of Anchor Brick; am now furnishing brick for facing large mills being erected on the Iron Works Dock, Fall River, and all the brick for their chimney, 346 feet high from the ground.

The sheds of my plant cover nearly eight acres of ground. This plant includes five steam-engines, one locomotive, thirty cars, two miles of track, a steam-shovel, eleven steam brick machines and twelve circular tempering pits.

Strict attention is given to filling the pits, in which the material is ground by tempering-wheels before going into the moulding-machines, so as to make a uniform and thorough mixture, thus insuring evenness in size, texture and burning.

They are full-sized, and the heaviest brick of their kind made, showing great density.

S. Hamilton, Jr.
Croton Landing, N. Y.

NOTES.

The expostulations raised by many of the papers on the use of imported enamelled brick for the Congressional Library at Washington have called attention to the fact that, while enamelled brick are manufactured in this country, those of foreign make seem to be invariably preferred by architects. The principal reason is said to be that the American brick are thoroughly manufactured before the enamel is applied, so that the application of the glazed color is an added, instead of a component part, and not so durable as when the glaze is thoroughly incorporated with the clay. Messrs. Chas. R. Weeks & Bro., 74 Murray Street, New York, have been appointed the sole agents in the United States for the glazed or enamelled brick manufactured in Kilmarnock, Scotland, by Messrs. J. & M. Craig. The Craig fire-brick and clay have been well-known in American markets for many years; but, while the Craigs have manufactured enamelled brick for twenty years, they have only recently been introduced into this country, although sold in large quantities in all parts of Great Britain. The glazing is very brilliant, and is claimed by the agents to be found more so than the best-known English brands; this would have the effect of reflecting light better. Messrs. Weeks state that Craig's stretchers glazed on one side present a glazed surface of $27\frac{9}{16}$ square inches; the American size has a glazed surface of 19.89 square inches. This means that 725 Scotch brick give the same surface as 1,000 American size. In the process of manufacture of the Craig brick they are subjected to a very high heat, the brilliant glaze with which they are coated being thereby thoroughly incorporated with the body of the clay, rendering the brick perfectly impervious to weather, non-absorbent of chemical or other vapors, and incapable of being permanently soiled or dirtied. Messrs. Weeks & Bro. will be pleased to furnish prices and sample on application.

The Matt. Taylor Paving Co., of 16 State Street, New York, have recently opened a branch office in Boston, at No. 12 Pearl Street, and are now completing several contracts in that city and preparing to take in hand others. They have recently completed the platform work of the new depot of the Central Railroad of New Jersey at Communipaw; also the fireproof floors of the new *Judge* building on Fifth Avenue, corner Sixteenth Street.

"SPHINX" PORTLAND CEMENT.

The demand for a *superior quality* of Portland cement has become so great, that I have found it necessary to supplement my Stettin ("Anchor" brand) with another one which I can equally recommend, and on my recent trip to Europe I made arrangements for the entire control for the United States and Canada, of the celebrated "Sphinx" Portland Cement, manufactured at Boulogne, France. Most of my customers will remember that I had some importations of this cement in the year 1887, and it was received with so much favor that I should have had a ready sale for it had I continued importing it, but there were difficulties in the way, regarding freight, which have since been overcome. As to its quality, I rely principally upon the *practical* experience of those who have *used* it; but for the information of others, give extracts from some tests made in this country, viz.:

BY THE DOCK DEPARTMENT OF NEW YORK:

Fineness. —
99 per cent through a 2,500 mesh sieve.

Tensile Strength. —
Mixed Neat and broken in 7 days — 489 lbs. per sq. in.
Mixed, 1 part Cement, 2 parts Sand, and broken in 7 days — 225 lbs. per sq. in.

BY CAPTAIN W. W. MACLAY, M. A., Civil Engineer.

Fineness. —
98½ per cent through a No. 80 sieve.
99½ " " No. 60 "
100 " " No. 50 "

Tensile Strength. —
Mixed Neat and broken in 7 days — 570 lbs. per sq. in.
" " " " " 28 " 734 " "
Mixed, 1 part Cement, 3 parts Sand, and broken in 7 days — 134 lbs. per sq. in.
" 1 part Cement, 3 parts Sand, and broken in 28 days — 244 lbs. per sq. in.

Captain Maclay adds to his report:

"This cement is a slow-setting Portland, and the results of the seven day tests show it to be of great tensile strength, both pure and when gauged with three parts of standard sand."

"It is ground exceedingly fine and seems to possess every quality of the highest grade of Portland cement manufactured."

"The result of the twenty-eight day test is even more satisfactory than that of the seven day test, and shows that this cement when gauged with *three* parts sand, twenty-eight days old, is superior to most of the commercial brands of Portland cement when gauged with *two* parts sand."

NEW CROTON AQUEDUCT.

Fineness. —
86 6-10 per cent through a 10,000 mesh sieve.

Tensile Strength. —

Mixture	Broken in	lbs. per sq. in.
Mixed Neat, broken in	1 week,	358 lbs. per sq. in.
" " " "	1 month,	464 " "
" " " "	3 months,	546 " "
" " " "	6 "	900 " "
Mixed, 1 part Cement, 1 " Sand,	broken in 1 month,	568 " "
" 1 " Cement, 1 " Sand,	broken in 3 months,	657 " "
" 1 " Cement, 1 " Sand,	broken in 6 months,	659 " "
Mixed, 1 part Cement, 2 parts Sand,	broken in 1 month,	371 " "
" 1 part Cement, 2 parts Sand,	broken in 3 months,	396 " "
" 1 part Cement, 2 parts Sand,	broken in 6 months,	486 " "

There is always a variation in the tests made by different engineers, owing to slightly different methods being adopted; but they all agree on the superiority of the "Sphinx" Portland Cement, especially as it increases with age, and when mixed with sand, which are the only means of ascertaining the *true* value of Portland cement.

It is always uniform and of a good color, being slightly darker than the Stettin "Anchor."

Buyers are now fully alive to the fact that it is poor policy to buy a second-grade cement; and many of the disasters we have had, and failures in large engineering works, may be traced to an inferior or irregular cement.

The company manufacturing the "Sphinx" Portland Cement, is well-known throughout France, and has a very large capacity. Its president and directors are amongst the most wealthy and reputable people in that country, and the cement always has a ready sale.

I have cement now at sea, and shall be happy to quote prices "to arrive."

ERSKINE W. FISHER,
Welles Building,
18 BROADWAY, NEW YORK.

ANTI-SIPHON TRAP VENT.

As an evidence of the appreciation in which the McClellan Anti-Siphon Trap-Vent is held by those who have tested it, we present a few of the many expressions of opinion in regard to it:

[From Mr. Leonard D. Hosford, Secretary of the Master Plumbers Association of New York City.]

Office of Leonard D. Hosford, Practical Plumber, 43 Beekman Street.
NEW YORK, N. Y., June 7, 1889.

DR. E. S. MCCLELLAN. — *Dear Sir,* — After carefully watching the operation of your Anti-Siphon Trap-Vent in the many places where I have used it, particularly in my own house, I unhesitatingly endorse it as a protection against trap siphonage, and have always found it to operate satisfactorily when properly adjusted. Very respectfully,
LEONARD D. HOSFORD.

[From Carrol Phillips Bassett, M. Am. Soc. C. E.]

NEWARK, N. J., June 21, 1889.

DR. E. S. MCCLELLAN. — *Dear Sir,* — Your favor of June 5 duly reached me. I am much gratified in stating my high appreciation of the value of your Trap-Vent, and my confidence in its operation. That you have

ALPHABETICAL LIST OF ADVERTISERS.

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Aeschlimann & Pellarin ... ii
American Encaustic Tiling Co. ... i
American Fire Ins. Co. ... iii
Ames Mfg. Co. ... xv
Anderson Pressed Brick Co. ... xxiv
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Law office of David J. Berry.

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NOTES.

THE mammoth sugar refinery of Claus Spreckels, of Philadelphia, is being equipped with its apparatus. The steam-plant consists of thirty Babcock & Wilcox boilers, which are located on the first and second floors of the building. Each boiler is fired by a pair of Roney Mechanical Stokers, making 60 stokers in all. The Stoker plant, together with the complete coal-conveying apparatus, is put in by Westing-house, Church, Kerr & Co., of New York, and is so arranged that the coal is handled mechanically and without manual labor of any kind, from the time the car of coal is dumped until the ashes are shot into the ash-vault. Mr. Spreckels has thus far contracted for 31 Westinghouse Engines as a part of the power plant. Fifteen of these engines, each of sixty horse-power, are for driving the centrifugal dryers; each engine being coupled direct to its own dryer, dispensing altogether with line shafting. The investigations on the part of Mr. Spreckels, together with his architect and engineer, which led up to this arrangement, were unusually interesting and complete. An entire set of apparatus was shipped to the Westinghouse Machine Co., at Pittsburgh, together with a supply of raw sugar, and the necessary workmen. The plant, including the engine was duly erected, and the processes gone through with and the sugar refined on the spot. The power required, and cost of same, was thus carefully ascertained, and the order for engines placed accordingly.

HENRY R. WORTHINGTON, of New York, sends us a plan of the buildings of the Paris Exhibition on which are indicated the locations of eleven pieces of his well-known pumping apparatus. The notable feature is that eight of these pumps are in daily operation doing their part in the maintenance of the exhibition in proper operation, for on them in a large measure depend the water-supply of the entire exhibition, the operation of some of the elevators in the Eiffel Tower, the working of the Edison Electric Light Station and so on. Besides these there are exhibits proper of the pumps, etc., in full-size and as models in the proper classes. In all there are twenty-three Worthington pumps on the ground, including one 6,000,000 gallon high-duty engine.

THE Whittier Machine Company have recently put into the Hunnewell Estate Building on School St., this city, an hydraulic piston passenger elevator with their pressure-tank system complete. They have put into the building of Daniel Swan on Central Street, Lowell, Mass., a complete heating apparatus including a horizontal steel boiler, together with a passenger elevator operated upon their pressure-tank system. They have recently constructed for the Deane Steam Pump Company for their factory at Holyoke, Mass., two horizontal steel boilers each five feet in diameter; also for the Cresent Mills, at Fall River, Mass., six horizontal steel boilers, each five feet in diameter.

THE Boston and Albany R. R., will light its new depot, at Springfield, Mass., with the Edison System, driven by two 65 horse-power Westinghouse Compound Engines, coupled directly to the shafting.

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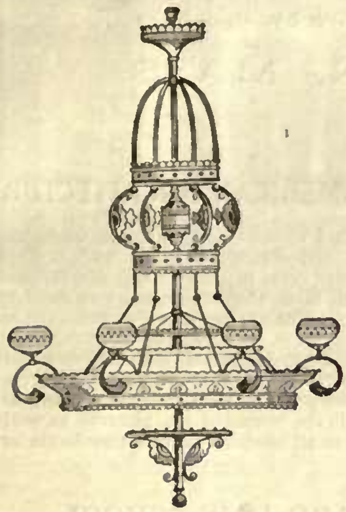
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First Baptist, Franklin, Ind.
Euclid Ave. Congregational, Cleveland, O.
Second Congregational, New London, Conn.
Twenty-Second St. Baptist, Louisville, Ky.
Methodist Episcopal, Chatham, N. Y.
Universalist, Titusville, Pa.
Presbyterian, Greenwich, Conn.
St. Stephen's, Worcester, Mass.
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Methodist Episcopal, Flemington, N. J.
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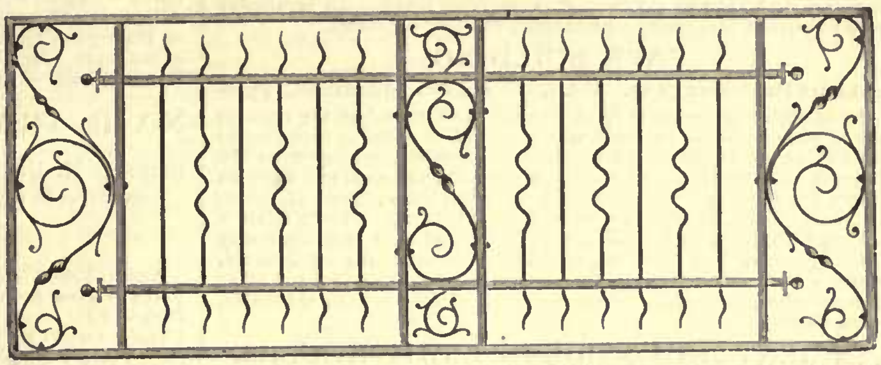
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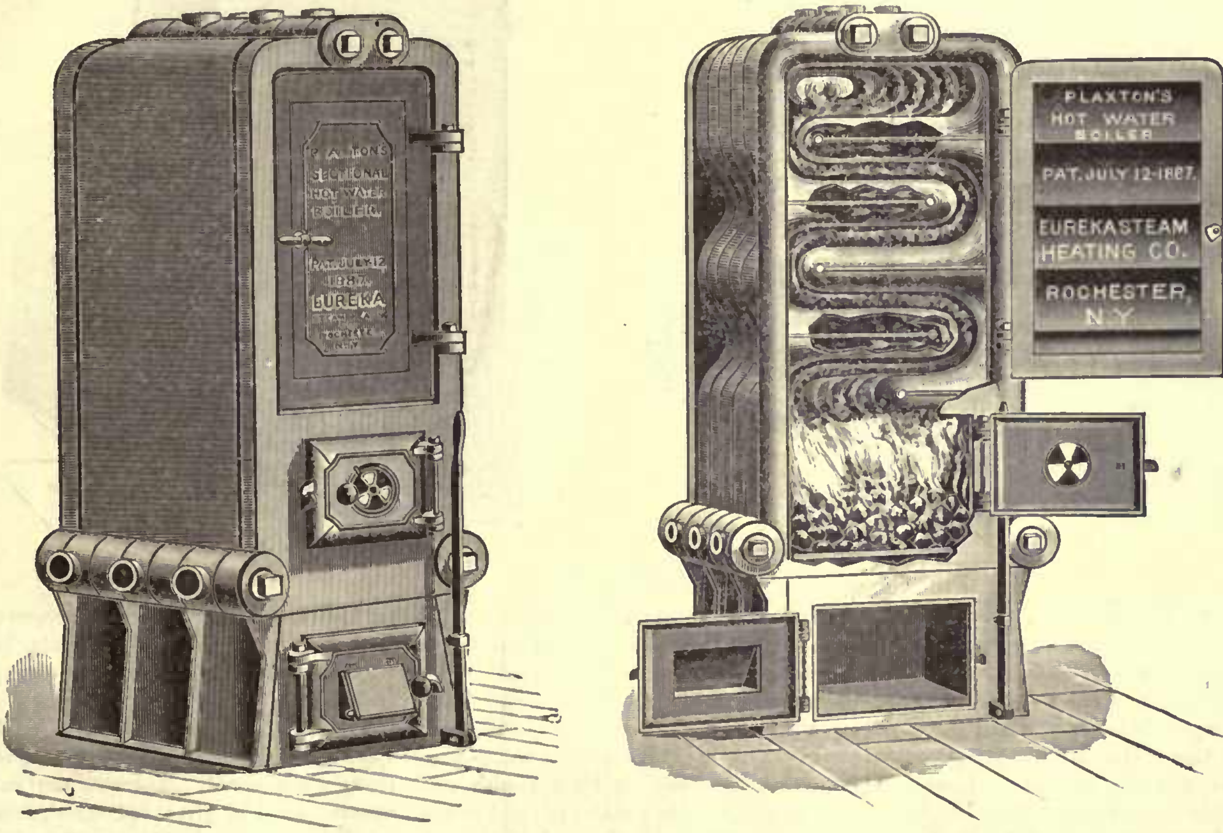
No. 87. SATURDAY, SEPTEMBER 7, 1889. VOLUME XXVI. No. 715.

THE EUREKA BOILER.

THE Eureka Steam Heating Company, Rochester, New York, have issued a new catalogue showing improvements and additions made to their former large line of manufactures.

The Celebrated Eureka Boiler has now a rocking and dumping grate and a dust damper, steel dome, and high or low base to accommodate different heights of cellars, etc. The grate is arranged so that it can be set to any of the boilers that have ever been put in. After a trial of two winters it has proved very economical and much more convenient than the old basket grate. They are now making their indirect radiator all sections interchangeable, as the old style (with five kinds of sections) being so complicated that it was very objectionable to the trade.

Two years ago they brought out the "New Rochester Radiator," and later the "Flower City." It is highly ornamented, very neat, and something new in ornamental radiators. It is furnished with or without caps. Both of these radiators are made for hot-water heating. They have secured the right to manufacture and sell the Plaxton Hot-Water Boiler in the United States. This boiler has been on the market for over three years, and has been set in all of the principal Canadian cities, and is now the leading Hot-Water Boiler of Canada. By reference to the cuts it will be seen that the boiler is built up of sections, and a back and front (both water-spaces) securely bolted together at the top and bottom. The joints are planed perfectly true, and packed with a special gasket made expressly for this purpose. The peculiar shape of the sections allow the expansion and contraction of the boiler to take place within itself, preserving the joints, allowing no leakage. This feature alone will commend itself to any fitter who has had experience with other boilers on the market. It will be noticed that the products of combustion, gas, heat, etc., after leaving the fire-pot, instead of being broken up and passing through several flues, are in this heater carried in one unbroken sheet through the entire length of the flue, and acting in the strongest possible manner upon the bottom, top and end of sections. The distance from grate to smoke outlet is thirteen feet, and though it is not claimed that all the heat derived from combustion is absorbed, it is claimed that in making this passage in this manner, greater benefit is derived from a given quantity of fuel, than where the fire travel is from three to six feet. Then again, as the water enters the boiler at fire-box and becomes partially heated, it rises up in the sections. Their peculiar shape enables the heat outside of section and water inside to travel through exactly the same distance and in the same direction, and to avoid all cross curves or diverging forces so that the claim for the quickest, strongest and most positive circulation is made upon good grounds; and neither a heavy fire or low fire will have any effect upon the direction of the circulation, which will always be from the bottom to the top of boiler, though necessarily faster or slower as the fire may be heavy or light.



The Plaxton Boiler.

The construction of this heater allows the proportion of grate to heating-surface to be carried out to a perfection never before obtained. Thus when a section is added to the heating-surface the same is added to grate-surface, thus insuring better results.

The grate is the well-known rocking grate, and is so constructed as to allow liberal air-spaces, assuring perfect and complete combustion. It acts alike upon all portions of the fire, removing ashes as effectually near the edges of the fire-pot as in the centre. It is easily cleaned, as all fire-surface can be easily

seen and reached upon opening the fire-door. This feature alone makes it a valuable boiler in all soft-coal countries, or where wood is to be the fuel.

The company are the only manufacturers of the Celebrated Eureka Boilers and Radiators, as they bought all of the patents, patterns and plant entire which the former company operated.

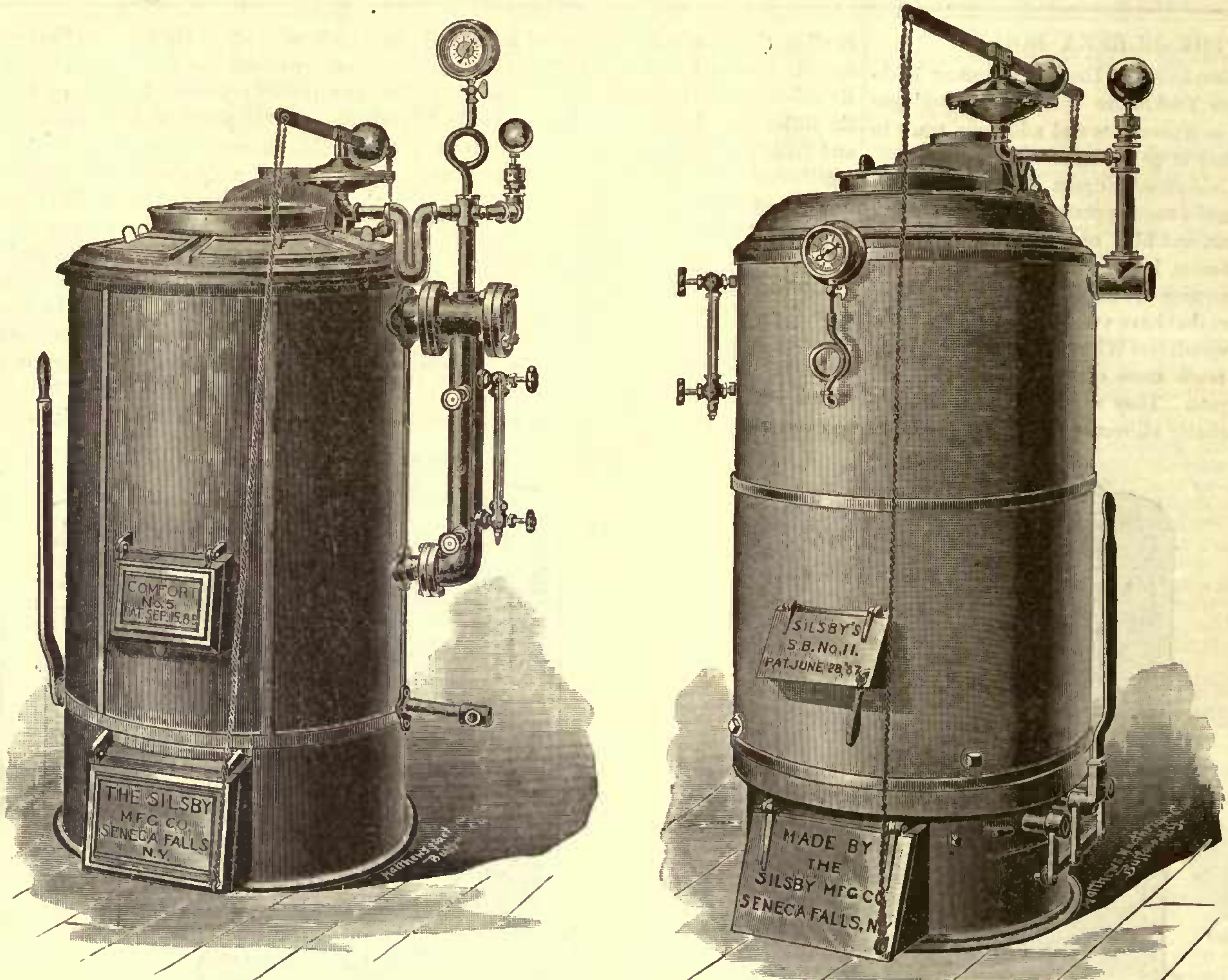
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Rochester, New York.

SILSBY STEEL BOILER.

The accompanying illustrations show the two styles of house-heating boilers now being manufactured by the Silsby Manufacturing Company, 242 Main Street, Seneca Falls, N. Y. There has long been a demand for a cheap construction of boiler to be used in the smaller class of residences and buildings, and for this purpose is recommended the "Comfort." In this heater all the objectionable features of cast-iron boilers, as heretofore made, have been overcome. Instead of being built up of many sections, as are most cast-iron constructions, the boiler in all the different sizes consists of but two sections; these are joined together by short lug bolts at flanges, which are connected to water-ways, and are easily accessible when jacket is removed. The connecting flanges between fire-pot and boiler, also water-column, are perfectly faced, and for the joint corrugated copper-gaskets are employed, no soft packings or cement being used in any of the joints. These boilers are very easily kept clean, as the fire-surfaces are vertical. By simply removing the covers (which are shown on top of boiler) all accumulation of soot or dirt is very readily swept down into the fire-pot. The grate is of the rocking and dumping type, very simple in construction and is easily operated. The magazine, or coal-feeder, is amply large for holding a sufficient amount of coal to last from ten to twenty-four hours, depending upon the severity of the weather. As will be seen, this boiler is very neat in appearance, is very compact, and has all the necessary trimmings and draught-regulating appliances.

The Silsby steel boiler is the invention of the superintendent of the steam fire-engine-department, who has been with the Company for the past twenty years, his aim having been to produce a boiler containing a very large amount of fire-surface, and at the same time to occupy the smallest amount of floor-space. This boiler consists of two shells of homogeneous steel, the one fitting within the other, forming a water-space between them of two and one-half inches. The inner shell has turned at the bottom a two and one fourth-inch flange or off-set, so that it fits tightly to the inner-surface of the outer shell. At the top, and between the shells, is a cast-iron ring, corresponding in thickness to the water-space. Both ends are securely riveted with steel rivets, and all joints are chipped and calked. The ring referred to projects above the ends of the shells far enough to admit of the dome or cap, which is made to fit perfectly tight. To the inner shell are attached circulating drums or cylinders, varying in size according to the size of boiler, the smallest being seven inches in diameter; these are made of steam-pipe. The said drums are capped at each end with cast-steel caps which have openings to receive smaller tubes, also a lug or boss at outer edge for connecting same to the shell or boiler, which is accomplished by the use of brass nipples. Through the drums pass smaller flues, which are expanded into the caps of drums in same manner as flues are expanded into ordinary flue-sheets. It will thus be seen that the water in the drums is divided or cut up very effectively and exposed to a very large amount of fire-surface, and that the circulation of the water is rapid and perfect. The self-feeding magazine, which passes down the opening inside the circular row of d ums, besides insuring a uniform fire for a long time without attention, also serves to confine the products of combustion through and around the drums, and in contact with the inner shell of boiler. In surface-burning boilers the fire is often very low in the morning and must be attended to, or it requires a long time to thoroughly warm the house. This magazine does not interfere, however, with the heater as a surface-burner during the day, if desired, and by filling it at night a quick, strong fire is had in the morning when it is most desired. The steel boiler is manufactured to meet a demand of the trade for a reliable and powerful heater, and one which will accomplish a large amount of work. It is plain, having very few parts, and is readily set up for operation by inexperienced persons.



The Silsby Steel Boiler.

The Company will cheerfully send, on application, their illustrated catalogue for 1889, which clearly illustrates the interior construction, and gives full description and price of the various boilers they manufacture, and also be pleased to give any other information that may be desired.

SILSBY MANUFACTURING CO.,
Seneca Falls, N. Y.

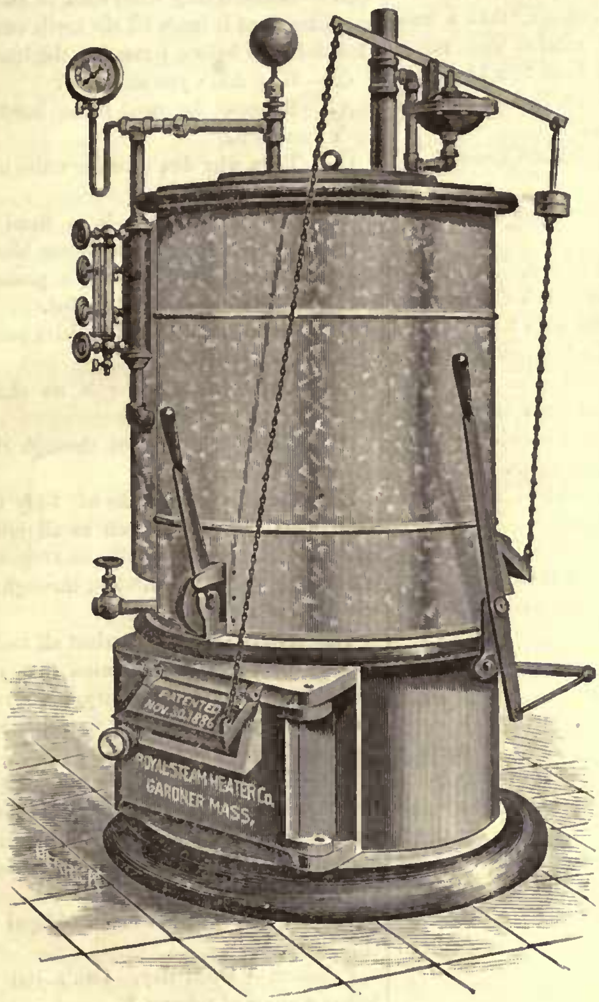
The Whittier Machine Company have recently put into the building of J. Franklin Faxon, on South Street, Boston, two belt elevators, one for freight and one for passenger service; also have built for the Boston Storage Warehouse Company of Boston, one of their No. 6 8″ x 10″ elevators for freight service; and for the Boston Real Estate Trust on Lincoln Street, Boston, two belt elevators for freight service

THE ROYAL STEAM-HEATER.

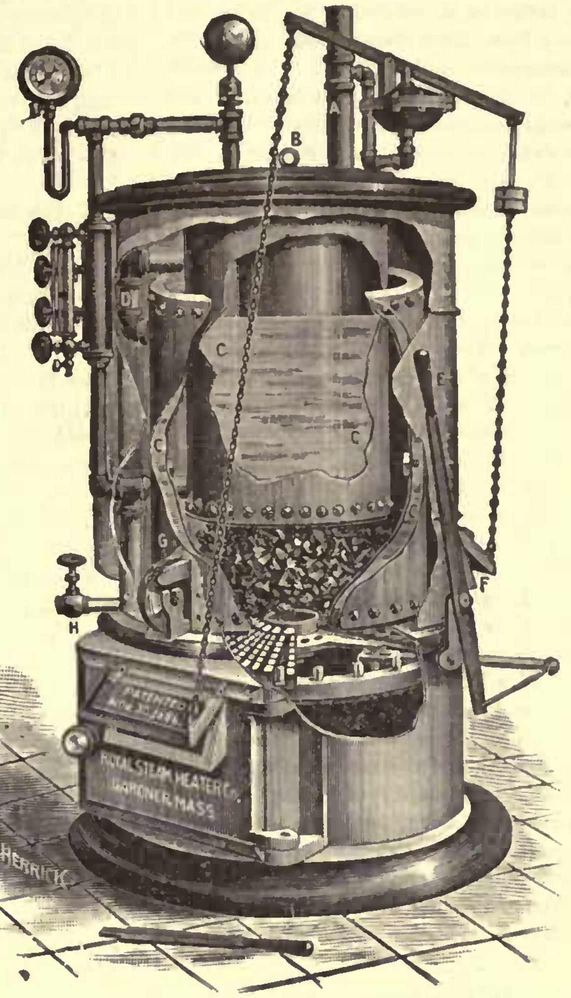
This heater combines all the principles required in a durable and economical boiler for heating purposes, being made in the most thorough manner, and constructed not only to be economical in the use of fuel, but as simply as possible, of few parts, and every part easily reached for cleaning.

The boilers are made of the finest grade of steel boiler-plate, in two parts, an outside casing with a thin water-space surrounding the fire and forming the fire-box. This is connected at top and bottom by pipes, with a tank or generator directly over the fire, and by means of these pipes a circulation is maintained between the two parts. The heat strikes directly against the water-filled sides of the fire-box and the bottom of the tank, then passes up through the narrow space between the two boilers, and down the outside to flue at the bottom. This large heating surface, surrounded by and in direct contact with the water, gives it rapid and economical steaming qualities, every part of the boilers, inside and outside, being reached by the fire.

There are no tubes to become clogged or leaky, and the flue between the two boilers can be cleaned (through apertures in the top for that purpose) without reducing steam-pressure. It is well known that ashes and soot are non-conductors of heat, and, when allowed to collect, prevent the heat being absorbed by the water, and the ease with which any part of the heater may be reached for cleaning renders it particularly adapted for house-heating, as they are often operated by inexperienced persons.



STYLE B.
With Magazine for Fuel.



DESCRIPTION OF SECTIONAL VIEW.
A—Main Steam-pipe. B—Magazine Cover. C C—Water Spaces. D D—Pipe connecting boiler. E—Lever for shaking grate. F—Check-draft. G—Arrangement for dumping grate. H—Blow-off-pipe to empty boiler, also to be connected with water-pipe for filling.

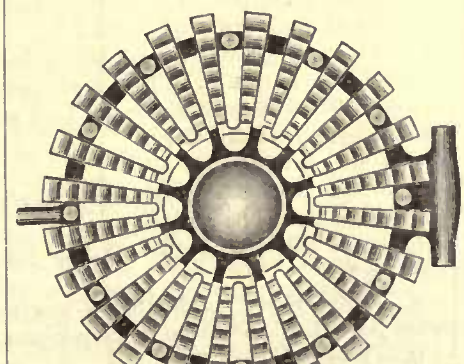
The Royal Steam Heater.

Every boiler is tested to 100 pounds pressure after all connections are made, and each boiler is provided with a fusible safety-plug that melts (should the water in the boiler get low), letting steam into the fire-box, and preventing injury to the boiler from becoming overheated.

Style B, as shown in cut, has a magazine for fuel. Self-feeding boilers are particularly adapted for heating purposes where it is desirable to run them as long a time as possible without attention.

The coal will feed down as needed, keeping an even steam-pressure that cannot be maintained when a large quantity is put into the grate at once, choking the draft and preventing a free circulation of air, which is necessary for free combustion, and to insure economical results from fuel burned. With our self-feeding boiler an even pressure of steam can be kept from twelve to fifteen hours without attention.

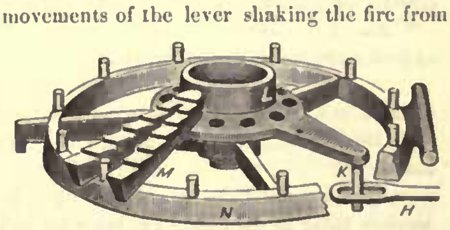
We also make a surface-burner. The general construction is the same as style B, with the exception of a door in front for fuel,



instead of a magazine. It has a deep fire-box, holding a large body of coal, and compares favorably with other surface-burning heaters in economy of fuel and ease of management.

The base consists of two cast-iron plates, with a drum of wrought-iron, and is fitted with a large ash-door and fender (that drops when door is opened, preventing ashes from falling on floor where heater is set), automatic draught, and levers for shaking and dumping grate.

The arrangement of grate and manner of cleaning out being very objectionable in some kinds of heating apparatus, we desire to call special attention to our patent grate, as shown in cuts. It consists of a centre, L, to which are pivoted the bars M; the centre receives its motion from the lever H, as shown at K, giving a grinding motion to the bars. These bars are kept in place by pins in ring N, allowing an end motion that works all clinkers and stones over the end of the bars—a few movements of the lever shaking the fire from



centre to outside—clearing it thoroughly and requiring no poker. The bars, being short and unconfined at one end, will not get out of shape.

Royal Steam-Heater Co.,
Gardner, Mass.

The beautiful new hotel at Child Wold, in the Adirondacks, owned by Mr. Addison Childs, is attracting great attention. It is finished completely with Creosote Stains, the colors being soft and harmonious.

FIRE-PROOF WIRE-LATHING.

Never in the history of our country has there been a more general awakening than at the present time, in regard to improvements in everything pertaining to the comfort and safety of the people. This is apparent to any one who will take the trouble to inform himself on what is being done in cities and towns, large and small, all over the country.

New and improved pavements, enlarged and purer water supplies, better and cheaper gas, more rigid building and fire inspection, and the use of better and safer materials in the construction of buildings, are only a few of the many improved methods for adding to the well-being of the people. In the matter of fireproof materials alone, the only wonder is that their use has not been made obligatory long before this, as their superiority and efficacy have been tested again and again, and mentioned in this journal. On July 25, 1888, the New Jersey Wire Cloth Company made an unusually severe test at Germantown Junction, noticed in our issue of July 30, 1888, which practically proved the perfect fireproof qualities of their patent stiffened wire lathing, and demonstrated to the architects, builders, and insurance men present that, if proper materials were used, the immense yearly fire-loss could be reduced to a minimum. While the cost of such materials may be somewhat more at first, the decrease in the rate of insurance on all buildings considered fireproof more than compensates, in the long run, for the original increase of cost. As another evidence that this subject will not down, we are happy to chronicle the fact that the committee having in charge the erection of the new building for the Convent of the Sacred Heart, at Manhattanville, N. Y., whose former building was destroyed by fire not long since, has concluded to run little or no risk of a like calamity in the future, and to this end determined to use, as far as possible, every known fireproof material in the construction of the new building. When it came to the matter of lathing, the committee promptly sent an order to the New Jersey Wire Cloth Company for corrugated lathing, which order has just been filled by the firm, to the great satisfaction of all concerned.—*Philadelphia Real Estate Record.*

THE JAIL-BREAKER'S CATECHISM.

Q.—Well, Mr. Jail-Breaker, have you made many escapes from jail?

A.—Yes, a great many.

Q.—How do you get out?

A.—In five ways:

1st. By cutting out with tools, like saws, chisels, files, drills, etc.

2d. By breaking out with levers, such as iron rods, pieces of timber, etc.

3d. By breaking out by heavy blows, with sledges, heavy stones, billets of wood, etc.

4th. By digging out through defective masonry.

5th. By watching my chance to knock a careless jailer in the head, and take his keys and walk out.

Q.—Which is the best and easiest way to get out?

A.—Steal a case knife from the table, and hack it into a saw, and saw out.

Q.—Can you cut an iron bar in two with a case knife?

A.—Yes; I can cut twenty of them with one knife?

Q.—How long will it take you to saw through an iron bar one inch in diameter?

A.—From two and a half to three hours.

Q.—Suppose it is *two inches* in diameter?

A.—Then it will take *more time;* that is all, and *the boys have plenty of time on hand to spare.*

Q.—Won't your saw become dull? If so, what do you do then?

A.—I hack it some more.

Q.—How do you hack it?

A.—The best way for quick work is to get two knives and hack them together—that gives me two saws.

Q.—Suppose you can't get any case knives?

A.—Then my Moll, or some of my friends will smuggle a dozen of jewelers' saws in to me.

Q.—Can that be done without detection?

A.—It has been done hundreds of times. In the County Jail at Columbus, Ohio, a man named Baker had a large ratchet drill smuggled in to him, and cut a hole 12 x 14 inches through an iron floor ⅝ of an inch thick, and let out eight "professionals."

Q.—Didn't the other prisoners know of it?

A.—No.

Q.—How many prisoners were then in the jail?

A.—One hundred and fifteen.

Q.—How is it the jailer didn't discover the holes when he inspected the cells?

A.—Well, Baker drilled a row of holes, and then filled them up as fast as he drilled them with a paste made of corn bread, bean soup, and dirt, so that you couldn't tell by looking at them. It's an old game.

Q.—Did you ever saw out of a fine jail that cost a good deal of money?

A.—Oh yes! I sawed out of the big jail at Cleveland, Ohio, that cost $180,000.00.

Q.—Did you do that with a case knife?

A.—Yes.

Q.—Can you cut out of a boiler-iron cell, and how would you do it?

A.—Yes; do it with a hard case knife, by breaking the end off of it, so as to make a sharp point. Every time I draw this point down a piece plate of iron, I cut out a small shaving. In a few hours I can cut out a panel large enough to let my body through. I cut out of the county jail at Toledo, Ohio, in this way.

Q.—Can you break out of a carbonized iron grating?

A.—Yes.

Q.—How would you do it?

A.—That depends upon how I find it. If it is hard, I can break it with a heavy boot or stone. If it is not hard I can saw it. Jim Bray and his pals got out of the new carbonized iron jail at Springfield, Ohio, by drilling the bars with a common brace and drill.

Q.—Cannot iron be carbonized in such a manner that it will present a uniformly hard surface, with a soft and tough centre?

A.—It cannot, except in small pieces that are very carefully treated. I have never seen two bars alike. Sometimes they are hard at one end and soft at the other.

Q.—Why is this?

A.—Ask any mechanic who understands case hardening, and he will tell you.

Q.—Are burglars usually skilled in jail-breaking?

A.—Yes. Every burglar learns how to break jail before he learns to be a cracksman.

Q.—Why so?

A.—Because any fool can cut out of an ordinary county jail, but it takes a good mechanic and a good kit of tools to break into a safe.

Q.—Well, suppose jail gratings were made of solid steel, how would you manage to get out?

A.—If bars are solid steel, I can break them if they are hard, because they must be brittle. If they are not brittle, they must be of soft steel, and, although as hard or harder than iron, can be easily sawed with such saws as I have described. The Cleveland jail that I sawed out of had soft steel gratings.

Q.—If you understand jail-breaking, why are you in jail now?

A.—Because I am in one of these Chrome Steel jails.

Q.—How is this Chrome grating made?

A.—Of iron and Chrome Steel welded together into a solid bar or plate.

Q.—Why can't you saw or file out through the gratings?

A.—Because they have steel in them that is so hard that it tears all the teeth out of my files and saws before I can saw the iron.

Q.—Why don't you drill out?

A.—Because the steel is so hard that I can't scratch it.

Q.—Then why don't you saw the iron and break the steel?

A.—Because the iron is so fixed that it covers and protects the steel from blows, and the steel is arranged so that it protects the iron from being sawed and drilled.

Q.—Can't you disjoint the bars some way, where they are riveted?

A.—No; because there is no chance to get at them.

Q.—Why don't you cut through the side of your cell, then?

A.—Because it is made of 5-ply Chrome Steel and Iron plates, such as all prominent safe manufacturers use in making burglar-proof safes, and you can't get through it with any kind of a tool.

This material is proof against all tools.

Q.—Then it is your opinion that you will probably go to the penitentiary and serve your time unless you can knock your jailer on the head, isn't it?

A.—Yes; I guess so. I can't get a chance to knock the old man on the head because this jail was planned by a jail architect who knew his business. The jailer can get at me, but I can't get at him.

Visitor.—Well, I am much obliged to you Good day.

Prisoner.—Good day. Can't you give a fellow a chew of tobacco?

[*Exit Jail-Breaker.*]

[*Enter Commissioner.*]

Visitor.—Well, Mr. Commissioner, you seem to have a good jail here. How much did it cost as compared with iron?

A.—Very little more than an iron one.

Q.—Why didn't you build it of iron, if iron is cheaper?

A.—Well, it would have cost less, to be sure, but when you consider that there were forty-three saw-out escapes made from iron jails in the State of Ohio in one year, and a proportionate number in other States, I doubt whether an iron jail would be cheap at any price.

Q.—Why not?

A.—Because jail escapes are expensive. A county pays officers to arrest, attorneys, judges and juries to try and convict, and builds jails to retain criminals. If the jail is not secure, all the money paid to criminal officers and for jail buildings is a bad investment.

If the prisoners can cut out with a case knife or break out in any way, it is not secure; therefore, the money had better be spent for a school-house or not spent at all.

We originally intended to use iron, but we argued this way. The gratings cost less than the rest of the building. If the gratings are not good the building is of no use, therefore, the best grating and cell material we could use would be the cheapest, because it would really make the building useful.

Besides this, a good jail is a standing menace to criminals. They are afraid of it, because they know it means business.

When they plan their work they look ahead like other sharp business men, and consider their chances of being caught and caged.

Those counties that have cheap jails are their favorite fields of operation, because they know that if caught they can escape.

These gentry are well informed on the subject of jails, and that is why I think that those officials who favor the use of ordinary iron jails because they are cheaper and are good enough, make a great mistake.

THE Whittier Machine Company have recently put into the building of Robert I. Fleming, on G Street, Washington, D. C., an upright steel boiler and an hydraulic passenger elevator, operated by their Pressure Tank System.

THE IMPROVED COMBINATION BOILER FOR HOT-WATER HEATING AND STEAM HEATING.

THE Richardson & Morgan Co., 92 Beekman Street, New York, proprietors of the original patent issued to William H. Page, of Norwich, Conn., for this boiler, having found it necessary to make an entire new set of patterns for its manufacture, the old ones having become seriously impaired through years of constant use, resolved upon making such improvements as, notwithstanding the very successful working of the old pattern, experience had shown were desirable. Without in any way departing from the original principles of its construction, the design has been altered with a view to better carry out these principles.

As is well known, the boiler is a cast-iron sectional one, each section having water-legs, which, together with the front and back sections, form the fire-box. The sections communicate with each other at the top by large openings into each other, thus forming a continuous dome from front to back, and giving as large a water-surface for escape of steam, when the boiler is used for steam generation, as is necessary for the quiet separation of steam from the water. The sections also communicate at the bottom by openings into each other, through which the water circulates. For hot-water heating, the dome being filled with hot water, the boiler holds more water than when used for steam; but as steam is generated by this boiler from water at 60° in about forty-five minutes, the temperature of 180° in the water being attained in thirty-five minutes, the boiler is as rapid a heater as is in any case desirable for hot-water heating.

The points in which the design of the boiler has been improved are, first, a very great reduction in the number of bolts required for putting the sections together, and a corresponding decrease of labor in its erection. Second, the calorimeter, or opening at the back of the fire-box for passage of heat-gases to the flues, has been increased to correspond fully with theoretical requirements. Third, the flues for passage of the gases of combustion to the up-take have been materially increased in size, whereby the draught is rendered more easy, and the boiler can be successfully used with weaker chimney-draught than formerly. Fourth, the passages for water-circulation, both horizontally and vertically, have been enlarged, whereby a more uniform circulation of water over the heated surfaces, and, consequently, greater uniformity in the action and increased efficiency of the heating-surface as a whole, is attained. Fifth, the heating-surface has been increased. Sixth, the anti-clinker grate has been strengthened and otherwise modified to render its action more easy and effective. Seventh, the boiler, as now constructed, can be enlarged or reduced by a single section, instead of being, as heretofore, increased or diminished by two sections at a time. This enables the boiler to be put on the market in sizes of from 4 to 12 sections, inclusive, or nine different sizes. The feasibility of making up 13 and 14 sections is also under consideration by the manufacturers.

Two small outside bolts at the bottom of each section (one in each water-leg) and one inside bolt of the same size serve to hold the sections together temporarily while putting the sections together. The sections are, however, permanently held together by three long bolts, one passing through the dome from end to end of the boiler, and one on each side passing also from end to end through the water openings at the bottom of the water-legs of the sections. These water-joints and the steam-joints of the dome are packed with a cement which will, if properly applied, last and keep tight during the life of the boiler, and which is considered more desirable than gaskets, which are sometimes unreliable. The fire-joints are made with a good quality of stove-putty, a tongue and groove being formed on the faces which come together to receive this putty, and make a perfectly tight joint, requiring but very little putty. The temporary outside bolts at the bottom of sections may be removed, if desired, after the three principal long bolts are screwed tight, the former having then performed their function. This method of putting the boiler together is extremely simple and easy, and saves much time, and the amount of cement required for steam and water joints is less than heretofore.

There exists a prejudice in the trade against the use of long through bolts for putting together cast-iron sectional boilers on account of the difference in expansion of cast-iron and wrought-iron. The Richardson & Morgan Co. have met this objection by the use of a peculiar yet cheaply-made compound bolt, invented by Mr. L. Allen, the expansion of which is the same as that of cast-iron. There can be no opening of joints when these bolts are used, as the bolts can easily be made to expand even less than the body of the boiler, and thus get tighter as the boiler gets its steam-pressure. The smaller sizes of the boiler do not require this special bolt. The increase in area of the calorimeter and the flues have rendered the combustion as nearly perfect as can be obtained in boilers of this size.

The water circulation is so perfect that from the time of starting the fire with everything cold, scarcely the slightest difference in temperature of the boiler can be detected by the hand placed anywhere on the exterior of the boiler.

Very exact and careful tests with different sizes of these boilers have been performed to determine their heating-capacity before placing them on the market. The manufacturers are sure that the following were actual results attained:

It is assumed that in low-pressure steam-heating with a well-covered system of piping, the water-of-condensation can be returned at 180° F. to the boiler, and therefore this temperature is made a basis for computation of the evaporative-capacity of heating-boilers instead 212° F. the standard temperature now used in estimating the evaporative-capacity of power-boilers.

A 4-section combination boiler evaporates 139 $\frac{57}{100}$ lbs. of water per hour from water at 180° F.; and 30 lbs. per hour being sufficient for 100 square feet of low-pressure steam-heating surface, the boiler is competent to carry a total of 465 square feet of such surface.

A 6-section combination boiler evaporates 207 $\frac{42}{100}$ lbs. of water per hour at 180° F., and is competent to carry a total of 691 square feet of low-pressure steam-heating surface.

A 10-section combination boiler evaporates 369 $\frac{3}{10}$ lbs. of water per hour from water at 180° F., and is competent to carry 1,231 square feet of low-pressure steam-heating surface.

These figures are for brick-set boilers run under the same conditions as when in practical use for heating, the draught being regulated entirely by the automatic damper-regulator and steam-pressure not exceeding 5 lbs. at any time.

The economy of this boiler as to fuel is shown by the following statement:

The 4-section boiler evaporated 8 lbs. of water from a temperature of 180° per lb. of coal actually consumed.

The 6-section evaporated $8\frac{81}{100}$ lbs. of water from a temperature of 180° F. per lb. of coal actually consumed.

The 10-section boiler evaporated $9\frac{45}{100}$ lbs. of water from a temperature of 180° F. per lb. of coal actually consumed.

The best result attained by power boilers worked under the best conditions is, according to the best authorities, 12½ lbs. of water evaporated from 212° F. per lb. of coal; the average of boilers in use is, according to the same authorities, not more than 7 lbs. of water from 212° per lb. of coal consumed.

Our readers can draw their own conclusions from these figures. Tests of other sizes are in progress, but could not be furnished in time for this publication.

Allowing an average temperature of radiator surface of 165° F. as that carried by hot-water systems — a high estimate — and the temperature of steam at 5 lbs. pressure being 227° F., the hot-water surface which can be carried by these boilers is as follows:

The 4-section will carry 640 square feet.

The 6-section will carry 950 square feet.

The 10-section will carry 1700 square feet.

For hot-water heating, outlets are provided, one in each section for independent connections, so that all differences in piping

required for low-pressure steam and for hot-water systems may be observed. When either of these are erected as they should be the manufacturers claim that the boiler will work equally as well for one as the other.

Catalogues containing details of construction, testimonials, etc., can be obtained from the manufacturers.

THE RICHARDSON & MORGAN CO.,
92 Beekman Street, New York, N. Y.

NOTES.

Messrs. J. & R. Lamb, of New York, have just placed in the newly-restored St. Paul's Cathedral at Buffalo, N. Y. (partially destroyed by fire a year ago), under the supervision of Mr. R. W. Gibson, of New York, the architect who has the restoration in hand, the entire stained-glass of the church, vestry and Sunday-school room, with the exception of the three lancet windows (replaced by the Fire Insurance Co.), and one transept window reserved for a future memorial. The entire scheme for the church includes very rich and effective work in the windows of the nave, and in the side-lights of the chancel are designed a mass of roses, which twine around a delicately jewelled cross. This treatment of flowers and jewelled work gives a most artistic effect, and leads the eye forward to the east end and its important figure memorial — the subject is the Ascension — the design of which is now being executed by Mr. Henry Holliday, of London, and will be set by Messrs. Lamb in the near future.

The following is a list of the work recently executed by Messrs. Aeschlimann & Pellarin, workers in Roman and Venetian mosaics, of 231 East Twenty-eighth Street, New York City: hall of the Salamanders, 18 Lafayette Place; Dr. Rayus's Russian and Turkish Baths, United States Trust Company's Building, Wall Street; and Central Turn Verein Club, Sixty-seventh Street, between Second and Third Avenues, New York, and the new building of Murphy & Co., varnish-makers, in Newark, N. J.

That artificial stone for pavements is still recognized as suitable for certain portions of buildings, where a variety in pattern is desired, is evidenced by the fact that the New York City-hall Plaza is to be paved with artificial stone, to be laid in three-foot blocks of different colors. The Department of Public Works have awarded the contract for this work to Edwin H. Wootton, of 35 Broadway, who has also the contract for laying the roadway in the Park from Broadway to Park Row with Seyssel Rock Asphalte. The artificial stone branch of Mr. Wootton's business has developed into large proportions, and he requests that when work of this description is desired by architects, that they would specify for "Variolithic" pavement, to be laid by the New York Mastic Works.

Messrs. Geo. Stone & Son, of New York City, are plastering a large building, corner of Church and Warren Streets, of which Mr. N. B. Tuthill, 52 Broadway, is the architect, with King's Windsor Cement. We are also informed that the new barracks at David Island are to be plastered with this material; and that Mr. J. J. Roberts has just completed a large job on Forty-fourth Street for Berkley School, A. B. Barlow, 149 Broadway, architect. This cement is now being used on a number of houses in Newark, Orange and Elizabeth. We understand that Mr. Lovell H. Carr, the head of the cement department of J. B. King & Co., is meeting with the success that the material warrants, and we infer that, with his energy and push, the demands for this cement will steadily increase.

The Gorton & Lidgerwood Company, 96 Liberty Street, New York, have just issued an exceedingly attractive catalogue, containing numerous illustrations and full description of their celebrated "Gorton" House-heating Boiler. The book is well gotten up, and a credit to this enterprising concern. It will be perused with interest by architects and builders desirous of keeping themselves informed regarding the most advanced methods of house-heating.

The Whittier Machine Company have put into the building corner of Essex and Kingston Streets, Boston, two hydraulic elevators operated by their pressure-tank system, and into the Chandler Building on Devonshire Street, Boston, an upright steel boiler and an hydraulic elevator, also operated by their pressure-tank system.

Messrs. J. & R. Lamb, of New York, have recently executed an important double-light memorial for the new building of the Children's Aid Society, corner Second Avenue and 44th Street, from the plan of Messrs. Vaux & Radford, of New York, architects of the building; the subjects being, Young David going forth to fight Goliath, and the Christ child tending sheep in the fields near Nazareth; emblematical of the two ideas of Courage and Obedience, which it is wished to keep as a constant lesson before the eyes of the children.

DYCKERHOFF
PORTLAND CEMENT

Is superior to any other Portland Cement made. It is very finely ground, always uniform and reliable, and of such extraordinary strength that it will permit the addition of 25 per cent more sand, etc., than other well-known brands, and produce the most durable work. It is therefore the most economical to use. 8,000 barrels have been used in the foundations of the Statue of Liberty. Architects and those interested in Portland Cement will please send for my pamphlet, which will be mailed free on application. It contains valuable directions for the employment of Portland Cement, a table of results of the strength of the Dyckerhoff Cement when mixed with sand and broken stone in various proportions, together with tests and testimonials of eminent Engineers, Architects and Consumers.

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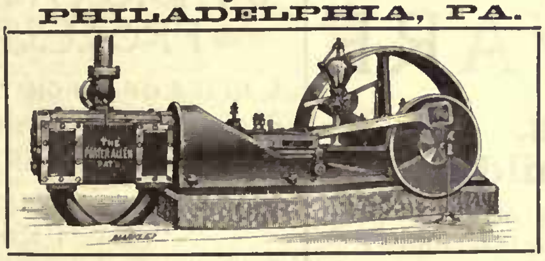
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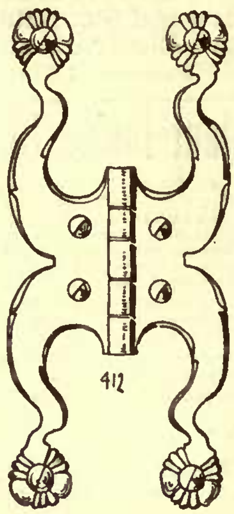
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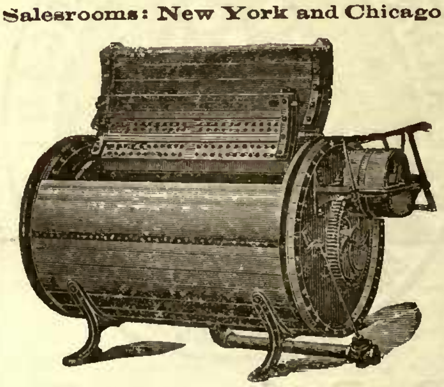
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THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 88. SATURDAY, OCTOBER 5, 1889. VOLUME XXVI No. 719.

ARTISTIC FLOOR-COVERINGS.

THERE is much truth in the belief that the present time is one in which the revival of artistic taste in the United States is a leading characteristic of the period.

Much has been written on the decoration of modern walls and ceilings of interiors, but the floors have apparently been left to take care of themselves. Perhaps the greatest advance in this direction was in the invention of Linoleum, which provides a really artistic floor-covering, made in a new and perfect material.

While giving due credit to carpet manufacturers for keeping well ahead of the artistic taste of the public, quite the reverse of artistic taste has been shown in the manufacture of oil-cloths. Their miserable and grotesque coloring and ugly designs seem to have been made only to spoil the more artistic and beautiful decorations and fittings of the house.

The introduction, therefore, of Linoleum, in which really beautiful designs and colorings are a leading feature, marks a new era in house-furnishing, because it provides an artistic floor-covering in perfect harmony with the best styles of modern decorative interiors.

In Linoleum the body-color is incorporated with the material, which, of course, lasts as long as the material itself. This color is usually quiet and unobtrusive in tone, and receives an extra decoration in brighter hues, to give effects similar to a carpet, or, in some cases, resembling a tesselated tile or parquetry floor.

Linoleum is composed of a waterproof material, with which ground cork is incorporated, resulting in a floor-covering which is noiseless and soft to the feet as a carpet, and, being a non-conductor of heat, it does not attract the warmth from our feet, as in the case of oil-cloth, but can be walked on in the coldest weather with the same comfort as a carpet, while in summer its cool and cleanly surface is a grateful relief in a heated temperature.

The Nairn Linoleum is made as wide as four yards, so that a moderate-sized room can be covered without a joint in the material — a great advantage in washing the surface.

Messrs. W. & J. Sloane, of New York, are the sole agents for Nairn's Linoleum, which can be obtained from them in a well-seasoned condition, and also in extra-thick material, with elegant borders.

For borders of carpeted rooms, kitchens, passages, bath-rooms, etc., in private houses, Linoleum will be found especially adapted; while its durability and cleanliness highly [illegible] ment-houses, and wherever the traffic is considerable.

We believe Nairn's Linoleum is the only form in which it can be obtained four yards wide.

MESSRS. J. & R. LAMB, of New York, have recently executed, from the suggestions of the architect, Mr. H. M. Congdon, six angelic figures in stained-glass for the windows on either side of the new chancel in the St. James Church, Cambridge, Mass. The figures are carried out in rich coloring, and so designed as to form harmonious groups of each set of three openings.

ENGINE SALES FOR AUGUST, 1889.

THE Westinghouse Machine Company report the following orders received in the month of August, 1889, viz.:

23	Junior Engines	630 H. P.
35	Standard Westinghouse Engines	1350 H. P.
22	Automatic Compound Engines	2055 H. P.
80	Totals	4035 H. P.

Among the prominent buyers may be mentioned the following:

Omaha & Grant Smelting and Refining Co., Omaha, Neb.		65	H. P. Comp.
United Gas Improvement Co., Philadelphia, Pa.		80	" "
Allegheny County Light Co., Pittsburgh, Pa.		250	" "
Sawyer-Mann Electric Co., New York, N. Y.		125	" "
Pocasset Manufacturing Co., Fall River, Mass.		125	" "
The Westinghouse Electric Co. Limited, London, England		250	" "
" "		150	" "
" "		65	" "
" "		50	" "
Denison Electric Light Co., Denison, Texas		2–100	" "
Henry C. Bowen Company, Providence, R. I.		50	" "
Electric Improvement Co., San Francisco, Cal.		2–100	" "
Marr Construction Co., Pittsburgh, Pa.		50	" "
Claus Spreckels, Phila., Pa.	2–7½ x 7 Stand.	50	H. P.
" " "	2–8½ x 8 "	70	"
" " "	3–9½ x 9 "	135	"
" " "	2–11 x10 "	120	"
" " "	3–12 x11 "	225	"
	12	600	H. P.
Safety Electric Light and Power Co., New York, N. Y.		35	H. P. Comp.
Colfax Electric Light and Power Co., Colfax, Washington Ter.		50	" "
East End Electric Light Co., Pittsburgh, Pa.	2–11 & 19 x 11	160	" "

AN ENGINE'S WONDERFUL RECORD.

At the Oliver Oil Company's mill at Charlotte, N. C., there is a 65 horse-power Westinghouse engine which has been operated night and day (starting at 12 o'clock Sunday night and stopping 12 o'clock Saturday night for five years, and during that time it has not cost five dollars for repairs, and the mill has never stopped a minute on account of the engine.

A SYSTEMATICALLY CONDUCTED BUSINESS.

The monthly stock-bulletin of the Westinghouse Machine Company, issued August 1, shows 232 completed engines in their warehouse, and 218 engines in progress through the shops. This makes a total of 450 engines, aggregating 22,500 horse-power. Orders for the past six months have averaged nearly 1,000 horse-power per month more than the out-put; hence, the present stock of engines, large as it is, is much below the normal. The shops are now running on double turn, and adding a line of heavy tools, and it is expected that their present capacity is fully 5,000 horse-power per month. It is the practice of the Company to keep in stock for immediate delivery a full line of engines of every style manufactured by them, from a 5 horse-power junior engine to a 300 horse-power compound engine. At present they are oversold in some sizes, particularly in the compound engines, for which there is an extraordinary demand.

VIBRATION IN BUILDINGS.

One of the most perplexing problems that confronts the engineer, is the vibration in buildings caused by running machinery. Messrs. Westinghouse, Church, Kerr & Company, of New York, being frequently called on to locate Westinghouse engines on the upper floors of buildings, have had a wide experience in this line, and have given the subject much thought. In determining these questions they say the character of the building, the ground on which it rests, the weight, power and speed of engines are all factors which must be considered, some of which are very indefinite, or at least, their effect is hard to pre-determine, combined with which is the very important influence, namely, the relation which the speed of the engine bears to the natural time of vibration of the floor-beams. It is evident that if the slight motion which every engine has is exactly in time with the natural vibration of the floor-beam, each pulsation of the engine will increase the scope of the vibration of the floor, resulting in a most disastrous shaking, while if the pulsations of the engine are in discord with the floor, comparative quiet will exist. As floor-beams are usually long, and their time of vibration correspondingly long, it is usually found that a fast-running engine will give less of its vibration to the floor-beams than a slow-running one. It is also worthy of note that the vibrations of a fast-running engine are more numerous and less forcible, hence easier resisted by the mass of the floor.

An interesting example of preventing vibration by discord was shown in the case of a Westinghouse 10 horse-power engine which, on an upper story of a silverware manufactory created such a commotion as to rattle the

silverware on the shelves a hundred feet distant. A change of 25 revolutions in the speed, which change was in the direction of increasing of the speed, entirely stopped the vibrations.

The erection of engines as large as this on upper floors is somewhat novel, and should only be undertaken with full consideration of the surrounding conditions and with engines which are completely balanced.

THE WESTINGHOUSE MACHINE CO.,
PITTSBURGH, PA.

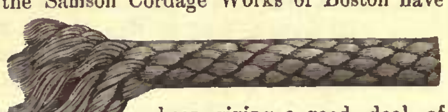
Messrs. Gorton & Lidgerwood Company, New York, have just received an order from the Government authorities at Fort Sheridan, Ill., for twenty-one of their celebrated "Gorton" Steam-Heating Boilers. This boiler is well adapted for military use. It is sectional and easily transported, requires no brickwork in setting, is economical in the use of fuel, and requires but very little attention. Besides this, it can be used for manufacturing as well as for heating purposes.

DURABILITY OF SASH-CORD.

Much more attention is now being given to the methods of specifying the hardware for buildings.

The article in the number of September 14 of the *American Architect and Building News* is very interesting, as showing that, by employing the proper methods, the best goods may be obtained at a fair price to the owner, and that, with an ordinary amount of care on the part of the architect, the specifications may be correctly filled, even with an unscrupulous contractor.

The best articles are now being sought as a matter of economy, and, with this in view, the Samson Cordage Works of Boston have



been giving a good deal of attention to the subject of increasing the durability of their solid braided cords.

This they accomplish by treating the cord with a waterproofing mixture, which may be applied to either the cotton or linen cord with equal benefit. The results of their experiments have just been confirmed by independent tests, made by one of their large customers, who writes "that waterproofing makes the rope last three times as long."

The company have lately increased their facilities for submitting their cord to the waterproofing process, which can now be done with trifling delay and at slight expense.

As the waterproofed cords are not carried in stock by the trade, the company will be glad to correspond direct with owners, architects and builders, who may be interested to procure the best and most economical cords for hanging window-weights.

As there are so many inferior qualities of cord in the market, the finish and hardness of braid should always be examined.

The purchasers may feel safe in buying cord with this company's trade-mark, which is placed on nothing but first-quality goods.

SAMSON CORDAGE WORKS,
164 High Street, Boston, Mass.

The Whittier Machine Company have recently put into the residence of Henry A. Rice, No. 13 Marlboro Street, Boston, an hydraulic plunger elevator for passenger service.

ECONOMY AND SAFETY IN USE OF STEAM.

In the history of modern inventions we are apt from one decade to another to forget those of the past in the consideration of those of the present and immediate future. So Electrical Science, while it cannot be said to have discovered new principles—it has developed to a wonderful extent the application of those already known. The fact that sound could be communicated by a wire railroad track, etc., is not new, but the application of that principle in the Telephone revolutionized to a large extent the manner of doing business. Years ago the Steam Engine was equally wonderful, but to-day Steam, probably the greatest of Physical agents in general use, is so common that it scarcely excites a passing remark. It is supposed by most persons that Steam-Engineering has reached the height of its glory. Such, however, is undoubtedly far from the truth. A large per centage of the power of Steam is lost by carelessness or ignorance. Burning volcanoes in the shape of boilers are under and about, even where we tread, the great majority of which have no reliable safeguard against explosion, and human life is constantly in danger. Simple and safe as is the use of Steam when properly managed, few persons realize, while walking upon the sidewalks, that under them—in our large cities—are hundreds of Steam Boilers in charge of men who are frequently but poorly paid, and are also required to do other work, necessitating absence, which absence, or a few minutes' sleep, or even an extra drink, may cause an explosion, which, like that at Hartford, Conn., might send a large number of human beings into a future untried existence, to say nothing of the great destruction of property.

When we consider these subjects, the question presents itself,—how far can these casualties be prevented? and we answer *entirely*, if the best devices are used for controlling the steam-pressure. As an illustration:—in the long lines of steam-pipes used for heating purposes in many public buildings, radiators and valves are all easily kept in good order by reduced pressure, which is effected by the use of an Automatic Regulator, which, while it secures a perfect heating pressure, also reduces the cost of fuel; the pressure is always uniform on the heating system. The constant outlay for repairs which are necessary, where the heating system is strained by high pressure at one moment, and an hour later allowed to contract by entirely shutting off the steam, is prevented by the use of an Automatic Regulator. Any expert steam-fitter will admit that there would be very little need of repairs provided the pressure on the steam-pipe was not greater than ten pounds, while steam at this force would heat equally well and save, as stated before, a large portion of the fuel and the leaking which in hotels and private houses especially are so constantly annoying guests and destroying carpets and plaster, etc. Thus far we have only spoken of the heating system as kept at an exact steam pressure by the use of an Automatic Regulator.

If the above reasons were all, the Automatic Regulator would save much time, expense and annoyance. In addition, however, where power is needed to run an engine, elevator, pump, or other mechanical device, where steam is used at full pressure, by the use of the regulator, steam may be maintained in the boilers at high pressure sufficient to run a steam-engine or elevator, and yet be reduced for heating to two or three pounds, thereby entirely preventing the snapping and cracking in radiators and heating pipes, which is so disagreeable and dangerous, and preventing the wear and cutting of the seats and stems of the globe valves.

In the best recent engineering practice, the exhaust steam of the engine and elevator is turned into the heating system of the building, and the regulator *automatically* supplies just the amount lacking to maintain constant pressure, say three to five pounds, in the pipes and radiators.

If the exhaust is sufficient, the regulator remains closed. If the weather becomes colder, or more rooms are heated, or the engine shuts down at noon or night, the regulator opens

(*Continued on Page* 3.)



automatically, and maintains the pressure at which it is set to close.

Having suggested the merits of Automatic Steam Regulators, a few words in reference to an Automatic Damper Regulator for the boiler will, we think, convince all that carelessness from any cause may have but little to do with accidental explosions, provided always the boiler is in good condition. Any device to be of value as a damper regulator should be operated by a positive power sufficient to overcome any ordinary friction in the dampers; fluctuations in pressure should be instantly felt by the damper regulator and the damper opened or closed as more or less heat is required. Again, where the least attention is paid to the boilers, and consequently the greatest amount of danger exists, sensitive but weak mechanical devices may by rust, dirt, etc., be so obstructed as to interfere with their working. Where the full pressure of steam is taken direct from the boiler the power is very positive to open or close the damper, and grows more so as the danger increases. If for any reason the fire be left carelessly, the damper will be automatically controlled as well at night as in the daytime.

A reliable damper regulator is a perfect safe-guard against over-pressure in the boiler; more reliable than even the safety-valve, because being always in motion it cannot become rusty or stuck.

Very perfect devices of this kind are manufactured by the Curtis Regulator Co., of Boston, Mass., whose advertisement will be found in another column. They also manufacture an automatic water-regulator, which will save a large percentage of the expensive repairs now made necessary by high-pressure and defective plumbing.

CURTIS REGULATOR COMPANY,
BOSTON, MASS.

CHURCH LIGHTING.

An essential element in the work of every church is a well-lighted sanctuary. A gloomy temple is not a wholesome place to worship in; cheerfulness belongs to Christianity. The church should be well supplied with windows to admit the sunlight, and supplied with the very best appliances known to science for the artificial light needed for illumination at night. The most efficient dispenser or diffuser of light, either from oil-lamp or gas or electric light, is the reflector manufactured by Mr. I. P. Frink, of New York. There are differences in the quality of reflectors as there are differences in the quality of flour. Competition has brought a number of inferior reflectors into the market. Those who reflect before they buy will buy the Frink Reflectors.

THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 89. SATURDAY, NOVEMBER 2, 1889. VOLUME XXVI. No. [illegible]

THE ATLAS HYDRAULIC ELEVATOR.

THE Hydraulic Elevator possesses peculiar advantages for all buildings designed for warehouses, hotels, apartment-houses or offices, being ready for use night and day and simple and inexpensive to operate, especially where the city water is abundant and maintains the requisite pressure. Even where a steam-pump and pressure-tank system is needed, a skilled engineer is not required. There are but three types of hydraulic elevator in common use, differing in the method of applying the pressure of the water, the differential pulley, the direct plunger and the hydraulic screw or Atlas Elevator, of which the following is a description:

First in importance is the motive power, which is furnished by the Atlas Elevator Engine or Hydraulic Hoisting-Machine, represented in our advertisement. It is generally located in the basement, near the foot of the elevator-shaft, but may be placed elsewhere if more convenient. The power is obtained from the pressure of water upon the piston, and in case sufficient supply and pressure from a street-main are not obtainable, a steam or other pump may be used to force the discharged water either into a direct-pressure tank near the engine or a gravity-tank at the top of the building, whence it is again supplied to the cylinder.

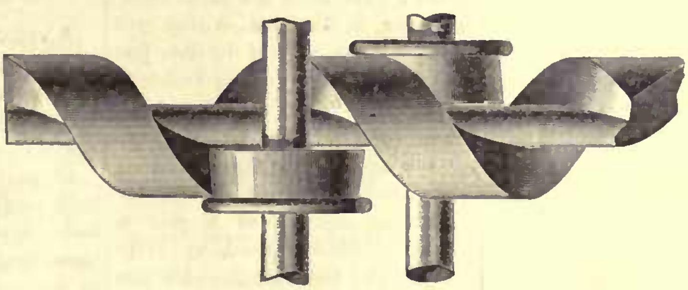
The cylinder is made of sound cast-iron, and tested to withstand a pressure of 200 pounds per square inch. It is open at the forward end. The piston packing can easily be renewed by any mechanic.

The operation of the engine is as follows: The wire hand-rope (passing through the elevator-car), being pulled downward, opens a balanced valve of special construction — shown at right of cut — admitting water to the cylinder back of the piston. There are two piston-rods, to the forward ends of which is attached a cross-head or nut, through which passes a six-inch cast-steel screw-shaft. A this screw-shaft, and both are made to revolve grooved winding-drum is keyed to the end of by the movement of the nut upon the thread of the screw; the nut, with rods and piston, being forced forward by the pressure of water in the cylinder. The revolving drum winds up the hoisting-cables and raises the elevator-car.

A slight upward movement of the hand-rope closes the valve and stops the car. A discharge port of the valve, allowing the water to escape from the cylinder. The car then descends by its own weight, causing a reverse motion of the drum, screw-shaft, cross-head and piston. The descending speed is regulated by the width to which the valve is opened.

The following cut shows (on a larger scale) the manner in which the screw-shaft passes between two heavy steel rolls in the interior of the cross-head or nut, thus doing away with friction and wear between nut and screw. The cross-head itself runs on rolls upon the flat top of the frame, roller-bearings of hardened steel overcome all end-thrust friction of the screw-shaft, and others surround the journals.

The piston-travel is usually one-tenth the travel of the elevator-car; in some cases it is one-eighth. The diameter of the cylinder varies with the water-pressure available and the load to be raised, and the length of the cylinder depends upon the height to which the car travels.



The Atlas Hydraulic Elevator Screw-Shaft.

The car is stopped automatically at upper and lower landings, and automatic safety devices prevent the accidental descent of the car in case of breakage of all the hoisting-cables at once, which is beyond possibility where two or more good cables are used.

If required, an indicator can be attached to the elevator, which will record exactly the amount of water used.

Particular attention is called to the construction and operation of the Atlas Hydraulic Engine, as they differ entirely from those of any other hoisting-machine. It will be seen at a glance that as a mechanical device for applying hydraulic pressure and converting the horizontal motion thereby obtained into a rotary for the purpose of winding the elevator-cable, this engine is far superior to the ordinary differential-pulley or sheave hoisting-machine. The friction is much less, and the severe straining of the wire cables between the two sets of sheaves is entirely obviated, as is the continual destructive wear of the sheaves and

For these reasons, *the cost of maintenance is much smaller*, as a set of cables on the Atlas Elevator will outwear several sets on other machines, and when they do need renewing the expense is considerably less, because so much shorter cables are used.

Fifty per cent more power is obtained from the same sized cylinder; consequently, there is *a great saving of water*. For instance, the Atlas Elevator's standard ordinary performance — using only 163 gallons of water at 100 pounds pressure in a 20 inch x 10 foot cylinder — is as follows: it raises a load of 2,000 pounds 100 feet in 30 seconds, and with 197 gallons at same pressure in a 22 inch x 10 foot cylinder it lifts 2,800 pounds an equal distance in the same length of time. Accurate tests show even better results.

Other important and valuable features are: perfectly smooth and noiseless working of both elevator and valve, absence of jar, and freedom from pounding and hissing of the water.

The Atlas Elevator is manufactured at Springfield, Mass., by the Springfield Foundry Company. They make a specialty of artistic wood-finish, decoration and upholstery for the interior of their elevator-cars, as well as ornamental and tasteful designs in wrought-iron and brass-work for screens, etc.

Their works include a fully-equipped, heavy machine-shop, besides large and complete iron and brass foundries. They employ intelligent and skilled workmen in all departments, their superintendent having had many years' practical experience in constructing hydraulic elevators, steam-engines and clutches. In addition to the Atlas Elevator, this company manufactures the Titan Hydraulic Plunger or Direct-Lift Elevator, belt and hand elevators, the Hercules Clutch (Gibbins's Patent), *friction and locking combined;* shafting, pulleys, iron and brass castings. They respectfully solicit correspondence from builders, architects, machinists and owners of buildings, and cordially invite them to visit their office (next door to the new railroad station) in Springfield, and inspect the construction and working of elevators, clutches, etc.

SPRINGFIELD FOUNDRY CO.,
SPRINGFIELD, MASS.

THE Whittier Machine Company have recently put into an apartment-house on Huntington Avenue, Boston, an upright boiler and a passenger-elevator operated by their

5,000 PER CENT INTEREST.— A GOOD INVESTMENT.

Pennsylvania Hospital,
Philadelphia, October 11, 1889.

Col. Tattnall Paulding,
Manager Employers' Liability Assurance Co., 416 to 420 Walnut Street, Philadelphia, Penn.

Dear Sir, — I am greatly obliged for your prompt attention to the claim made upon your company on account of recent accident with which I met in being thrown from a car of the Philadelphia Traction Company. The tickets upon which my claim was based had just been drawn from one of your Automatic Accident Boxes, and the promptness with which my claim has been met is quite in accord with the great convenience in procuring your policies from the boxes.

The investment of 15 cents has resulted, within a few hours, in my receiving from your hands a check for $750 to pay the claim for my serious accident. Again thanking you, I beg to remain Yours truly,
(Signed) Jas. L. Butler.

P. S. My residence is 122 East Upsal Street, and my office with the Equitable Life Insurance Company of New York, at Harrisburg, where I shall be glad at any time to say a good word for your company should it be necessary.

The above was paid for the loss of the left arm, as the result of being thrown from a cable-car on October 2, 1889.

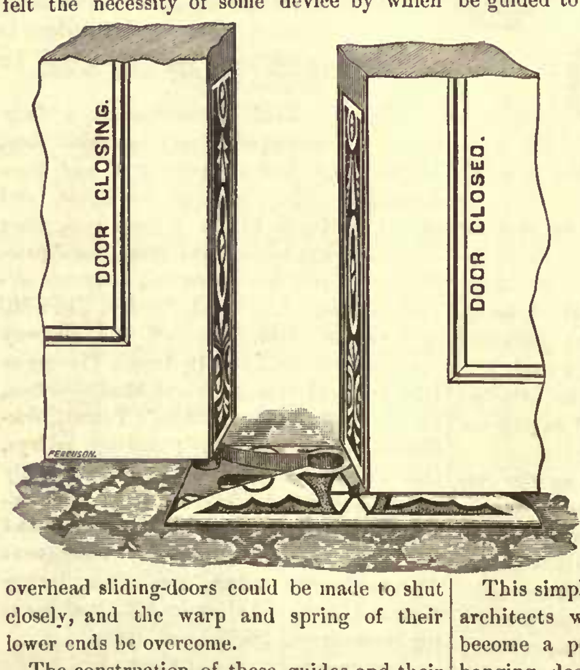
The Automatic Ticket Boxes of the Employers' Liability Assurance Corporation, Limited, will be found at railroad depots.

Deposit in the United States for the benefit of all policy-holders, $550,000.

No one should travel without taking one or more of these tickets. Ten tickets can be taken, insuring up to $5,000.

MARTIN'S GUIDES AND FOOT-LOCKS FOR SLIDING-DOORS HUNG OVERHEAD.

The following cut represents a new article in builders' hardware. It was invented and patented by a practical builder, who had long felt the necessity of some device by which



overhead sliding-doors could be made to shut closely, and the warp and spring of their lower ends be overcome.

The construction of these guides and their operation will be readily understood by an examination of the cut and is as follows:

The floor-plate is only 5-16 inch thick, bevelled each way, and is screwed to the floor midway between the doors, and the bolts are mortised flush in the faces of the doors at their lower ends. The bolts are then set by the machine-screw in the face so they will project below the lower edge of the door just far enough to catch in the guiding groove of the floor-plate, but not long enough to drag on the floor, so that the door, in closing, will be guided to the centre of the floor-plate.

These guides may be used for locking one-half of a pair of doors, when desired, by dropping the bolt into the slot provided for it in the floor-plate, or they form a perfect lock for a pair of doors when used in connection with a hook, as the floor-plate holds them in the centre of the opening, and will not allow them to move on their hangers.

They are also perfect stops to prevent the doors from sliding back into the pocket by placing the guide which comes with the hanger so the bolt will strike against it when the door is pushed back to its proper positnoi.

This simple device has been adopted by all architects who have examined it, and has become a positive necessity to all overhead hanging doors, and is being rapidly introduced into all first-class houses.

EMPIRE PORTABLE FORGE CO.,
Lansingburgh, N. Y.

The Whittier Machine Company have recently put into the Hotel Ludlow, St. James Avenue, Boston, one hydraulic passenger elevator, operated by their Pressure Tank System.

A BRONZE LECTERN.

A very massive antique bronze lectern of monumental dimensions is now being erected in St. James's Church (P. E.), Twenty-second and Walnut Streets, Philadelphia, as a memorial to Sallie Lewis Justice.

Supported on four massive lion's claws of bold modelling, holding in their grip solid balls, appears a heavy cruciform panelled base forming at its intersections an octagon, at the ends of the cross are the emblems of the Apostle St. James, the Pilgrim, still modelled after Nature, the panels of the cross hold in each panel emblems of the Holy Trinity, each one in a different design, while the panels at the intersection are adorned with branches of ivy vine, the symbol of affection; from this base rises a central octagonal shaft built in two upright sections with arches of rich tracery; from the arms of the cruciform base rise four elaborately wrought buttresses of a peculiar treatment ending in a foliated scroll, from which springs a branch of intricately worked leaves and Annunciation lilies.

These buttresses support the central shaft by a series of richly wrought moulding forming eight panels, the lower four of which are filled with double Maltese crosses, and the upper panels contain in *alto relievo* the emblems of the four Evangelists; from the buttressed octagon rises a round bossed member dividing to the top in four richly moulded bases held up by baskets; from these rises a cruciform shaft with four inserted twist-work columns, with elaborately wrought bases and capitals; on the end faces of the cruciform

member are placed under canopies the figures of the four Evangelists, each one holding a book.

The canopies are intersected by a bossed annulus of quatrefoil form, its centre showing a dog-tooth ornament; from this again rises a square shaft with four cluster columns and eight pearl-bead ornaments, meeting in an eight-clustered annulus from which springs a richly ornamented acanthus capital supporting a circular-moulded band and frieze containing the memorial inscription: "To the glory of God and in loving memory of Sallie Lewis Justice, died March 3, A. D. 1888. St. James's Church, All Saint's Day A. D. 1889."

This frieze is ornamented with a crown from which rises a half-globe supporting an eagle of bold and highly artistic modelling. The work stands eight feet high, and its weight is about 1,500 pounds.

The work was executed by
R. GEISSLER,
318–322 EAST FORTY-EIGHTH STREET,
NEW YORK, N. Y.

STAINED-GLASS DESIGNS.

NEW YORK, N. Y., October 3, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you kindly grant me a little space for the furtherance of a good cause? Repeated requests for original, and often elaborate designs, have compelled me to print the following reply:

42 WEST 18th STREET, NEW YORK, N. Y.

Dear Sir, — In answer to your favor soliciting a design for stained-glass, permit me to state that, while very willing to submit estimates, I cannot furnish designs without remuneration, unless the final work is entrusted to me; in which case it will be my earnest endeavor to meet your requirements. A large number of designs and many samples of leaded glass are to be found in my studio, and they will be shown you with pleasure; or, if distance permits, a competent person will call on you with an appropriate selection from the former. I can also indicate to you the buildings in which specimens of my art may be found, or can refer you to periodicals wherein a few of them have been published. You will doubtless agree with me that personal, artistic work cannot be executed gratis either with dignity or profit.

Thanking you for your communication, I remain,
Very truly yours,
FREDERIC CROWNINSHIELD.

NOTES.

THE Whittier Machine Company have recently put into the New York Homœopathic Medical College and Hospital, in New York City, an hydraulic passenger-elevator operated by their Pressure Tank System.

THE well-known firm of Merchant & Co., Philadelphia, has just closed a contract with the United States government to furnish the Mints with 100,000 pounds copper blanks for making pennies, and 50,000 pounds nickel blanks for coining five-cent pieces.

THE Hon. A. S. Hewitt, ex-Mayor of New York, is erecting a dwelling-house at his country seat, at Ringwood, Passaic County, N. J., which for cheapness, originality, durability and fireproof qualities, will probably excel any structure ever erected. The ex-Mayor, first erected a balloon frame, this he covered inside and out with New Jersey Woven Wire Fireproof Lathing, on this he placed a moderately thick coat of adamant plaster, serving the roof in the same manner. As a result he will have a stone house, positively fire, damp and vermin proof, at less than one-half the cost of a cheap frame building and a thousand times more durable. — *Philadelphia Real Estate Record.*

THE Whittier Machine Company have recently put into the store of R. Hollings & Company on Washington Street, Boston, an hydraulic elevator for passenger service operated by their Pressure Tank System.

THE Chrome Steel Works, Brooklyn, N. Y., sole manufacturers of the famous Chrome Steel, have just shipped three car-loads of their well-known Adamantine (Chrome Steel) Shoes and Dies to the Alaska Mill and Mining Company, Tacoma, Wash. H. D. Morris, of San Francisco, who represents the Chrome Steel Works on the Pacific coast, secured the order.

OWING to their business having grown too large for their present offices, the Gurney Hot-Water Heater Company, of Boston, Mass., will remove on November 15, 1889, to 163 Franklin Street, corner Congress Street, where they will have all their offices on the first floor, and will be pleased to meet all inquiring friends. The offices will be heated by hot-water, using the Gurney Heater and the new Gurney Radiator, and a full line of samples will be on exhibition on the floor. All interested are invited to call.

J. S. BULL & COMPANY, of Cortland, N. Y., have established a depot for the sale of fine shingles, especially the Puget Sound Red Cedar, which are the best in the world for fine modern houses, as they will outlast any other kind, have fine natural color and lay flat. Architects will find them to be just what is needed for all places.

The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 90. SATURDAY, DECEMBER 7, 1889. VOLUME XXVI. No. 728.

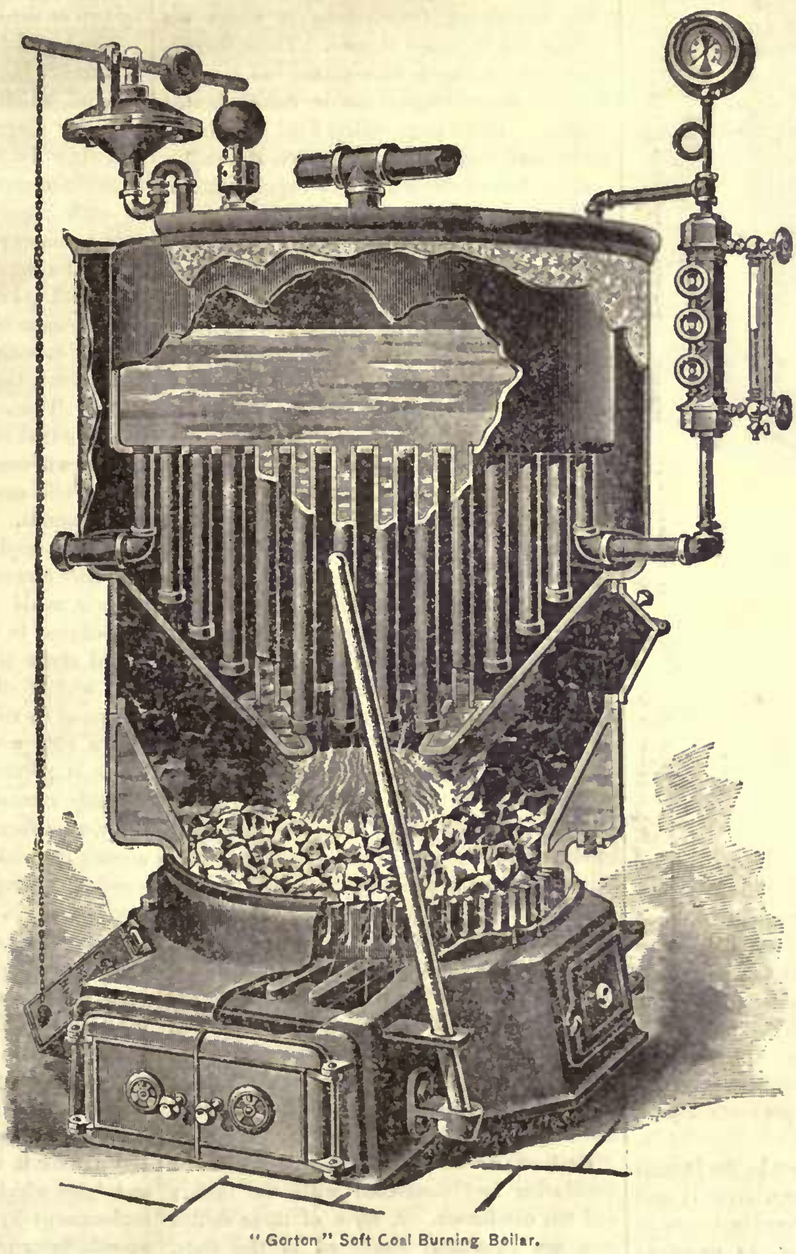
IT BURNS THE SMOKE.

THE new house-heating boiler illustrated on this page is the invention of Mr. Charles Gorton, of Brooklyn, N. Y., and will be manufactured by the well-known Gorton & Lidgerwood Company, of Chicago, New York and Boston. It is designed especially to burn the soft coal which is so abundant in many portions of the South and West, but which, from its tendency to deposit the unconsumed carbon or soot, which is an excellent non-conductor of heat, upon the heating-surfaces of the boilers in which it is used, has given much trouble to those who have used it, and, indeed, has rendered its use far from being economical in spite of the cheapness of such fuel.

The thick black smoke which causes the deposit of soot, is given off when the coal begins to burn or coke, and ceases when that part of the combustion is completed. The arrangement of the Gorton boiler is such that none of the smoke resulting from the coking process is permitted to reach any of the heating-surfaces until it has passed through the middle and hottest part of the fire, where, by the intense heat and admixture of sufficient additional air that is drawn through the fire, the smoke is entirely consumed and converted into a clear, bright flame, thus utilizing and making effective that part of the fuel which is always wasted.

The boiler, as clearly shown in the illustration, is surrounded by a non-conducting jacket of galvanized-iron lined with asbestos sheeting. The main or tubular part of the boiler is separated from the fire-pot by a casting, in the form of an inverted cone, that forms the upper part of the annular coal-reservoir or coking-chamber, the upper or large end of the cone ring rests on the water-leg, the

hottest part of the fire, and is protected by a water-ring which is connected by circulating tubes of the drum above, and being thus kept full of water is prevented from burning, and makes a valuable addition to the heating-surface.



"Gorton" Soft Coal Burning Boiler.

The area of the opening in the water-ring being less than that of the furnace-chamber, the gases pass through it with more rapidity, the atomic contact is greater, and, therefore, a greater mingling and diffusion of the gases takes place while passing through said opening than would be the case were the opening larger,

the cone ring, they expand, giving off an extremely clear and intense heat. The lower part of the coking-chamber is formed by an annular water-leg that is also connected with the drum above by suitable circulating pipes.

The position of the coal-pockets is such that the reservoir can be as easily filled as an ordinary kitchen range.

The reservoir will hold enough coal to last from twelve to twenty-four hours. The fingered ring which surrounds the grate allows the air to pass through the fire, thus keeping up a sharp fire long after the grate is covered with ashes. The boiler as shown in the illustration is arranged for heating with steam, but is equally well-adapted for heating with hot-water.

The base used with this boiler is of the improved pattern, having the upright lever attachment for shaking the grate, already described in these columns, and which is now applied to all the boilers manufactured by the

GORTON & LIDGERWOOD COMPANY,
CHICAGO, BOSTON, NEW YORK.

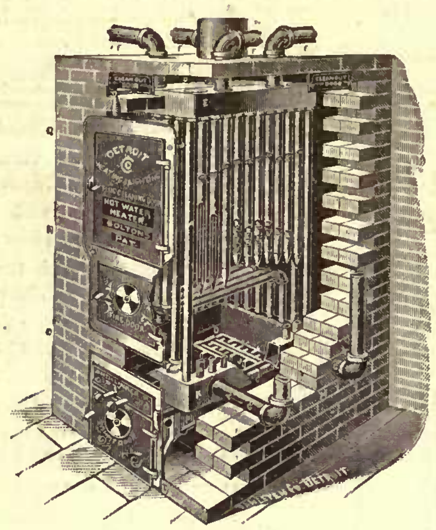
"LIQUID WARMTH."

UNDER the above heading, the Boston *Advertiser* has the following to say in regard to hot-water heating and one of Detroit's most rapidly-growing business enterprises:

"The system of hot-water heating for dwellings, offices, public buildings, etc., is not a new one, but as old as human civilization; neither is it an experiment, but a grand scientific theory successfully reduced to practice. Its record is historical. Long before the Christian era, in the days of Seneca, we find that hot-water conveyed in pipes was used for heating the public baths of ancient Rome. About the middle of the last century, it was first used in France for warming artificial incubators to hatch chickens, and a few

England, and soon came into general use in London for warming the royal palaces, public buildings and residences of the nobility. Its feasibility was demonstrated by English architects more than a hundred years ago, and it is now the generally-adopted method of warming the upper-class homes of all the principal European cities. It migrated to Canada with the English colonists of the province, and, notwithstanding its severe test in that cold climate, is now more generally used there than any analogous system. Within the last eight or ten years it has obtained a strong foothold in New England, and has also been extensively introduced in the Middle and Western States. This system has received the unqualified indorsement of the best writers on physiology and sanitary science on both sides of the Atlantic. It has also been so satisfactory and pleasant in operation wherever installed that it is rapidly growing in popular favor.

"In Canada, where for years this has been the favorite system, boilers constructed of wrought-iron pipe have been found to possess the greatest durability and most extensive heating-surface. Many now in use in the lower provinces were put in twenty years or



more ago, and show as yet no weakness. The Bolton Heater, now so widely known and used, is a modification of this type of boiler.

"While retaining all its durability and even greater fire-surface, it combines with these features the vertical circulation, which is now recognized as essential to the highest efficiency and greatest economy of fuel.

"The advantages of the Bolton are easily seen. In addition to its simplicity, durability and efficiency, it is exceedingly easy to clean, as soot does not readily cling to its vertical surfaces and is easily removed; it is practically all one piece, all the parts being screwed together, and having no bolted, flanged or packed joints to leak; it has the perfection of an anti-clinker rocking and dumping grate; repairs, while seldom required, are easily made, as any pipe can be removed by an ordinary workman through the front opening. It has a brick casing, which prevents loss of heat in the cellar.

"This heater is manufactured by the Detroit Heating & Lighting Company, Detroit and Chicago, who are also the manufacturers of the Combination Gas-Machine, an excellent apparatus for furnishing cheap and excellent gas to isolated residences and business buildings."

The Globe Ventilator Co., of Troy, N. Y., have recently placed two forty-eight-inch ventilators in the new Abstract Building in Chicago.

ENGINE INSURANCE.

We have made frequent, plain and explicit statements of the fuel duty of the Westinghouse Compound Engine. In this paragraph it is interesting to explain "how we know, you know."

If the duty guaranties as usually made are run down to their source, it will generally be found that the performance undertaken is based on a theoretical computation from the data of steam pressure, degree of expansion, clearance, etc. In other words the duty is one which the builder *hopes to get*. Possibly he has gone further and made an accurate test of one or more of his engines in actual service. On the results thus obtained he predicates his guaranty for all other engines without regard to size, conditions or individual deficiencies. In other words it is a duty which he *has once had*. He may even go further and at considerable expense erect and test an engine in his shop, and assume that all other engines of the same size would give the same performance. In other words it is a duty which he *thinks he has got*.

Contrast the above, of which the first is by far the most common case, with the way duty is actually determined. At the works of the Westinghouse Machine Company is a test-room containing foundations on which ten engines can be tested at once. These foundations are provided with planer-bed tops, so that any size of engine can be readily bolted to them. Three large boilers fired by natural-gas furnish steam at any pressure, and super-heating devices are added for experiments in that direction. The full load is given to the engine by a Prony friction-brake lubricated with suet and cooled by the circulation of water in the hollow rim of the wheel. The Company has from the first tested all their engines individually under a full load, simply for power and running qualities, from the 5 horse-power Junior Engine to the 250 horse-power Standard Engine. On the completion of the Single-Acting Engine came the conviction that it must go before the public on an unimpeachable record for economy. To this end we must *know* the duty of *each engine individually*, and it was determined that each engine should be tested for its actual consumption of steam and brought down to a standard performance before shipment. A large surface-condenser and air-pump was, therefore, provided of sufficient capacity to maintain vacuum for 500 horse-power. Below the condenser are two galvanized-iron tanks standing on iron scales in such a position as to receive the discharge from the condenser in either tank at will. It is evident that with this arrangement all the steam which enters the engine will be accounted for in the condenser in the form of water, except such as may pass from the overflow in the crank-case, which is separately measured. The accuracy of the test is, therefore, beyond question, while at the same time it is practical in its nature, and presents no refinements beyond what may be reproduced in ordinary commercial usage.

Each engine when completed is bolted to a foundation and connected with the boilers and the condenser. A force of three skilled men are constantly employed in the tests. No. 1 manipulates the brake, maintaining a full and steady load, and noting the brake ·eadings which give the net horse-power. No. 2 takes frequent indicator diagrams showing the gross or indicated horse-power. No. 3 fills, weighs and empties the tank, keeping the log of the run.

The difference between the indicated and brake horse-powers is that lost in friction of the engine. In new engines which are stiff and close in their fits the friction would range from 6 to 8 per cent of the full load. After a few days run the friction falls to 3½ or 5 per cent, doubtless a lower percentage of loss than can be realized in any other engine not similarly lubricated. It having been demonstrated that the water-rate is independent of the length of the run, the tests are for convenience usually of ten minutes' duration, and are repeated several times on each engine. The weight of water collected in the condenser divided by the horse-power and corrected for the duration of the test is, therefore, the duty of the engine in pounds, of water per horse-power per hour. The first tests are always made with the condenser open to the atmosphere, no vacuum being maintained and the condenser serving only to collect the steam exhausted. If a vacuum test is desired the condenser is closed and the air-pump started. Every engine turned out is obliged to show a water-rate non-condensing as slow as 24 pounds per horse-power before it is passed. Experience has shown that its duty is improved at least one pound after the packing rings, etc., have worn tight by two or three months of use.

The log and results of the test are entered in a record book, an abridged fac-simile of one page of which is here shown. The original indicator diagrams taken during the test are pasted on the opposite page and the signatures of the men conducting the test are subscribed to each record. The manufacturer, therefore, becomes positively assured as to the duty which the engine he is about to purchase will give, and takes no chances whatever. The thoroughness of this system will strike every careful investigator. Its value to ourselves is, however, the point which we have most in mind. Thus, for instance, it occasionally happens that out of a lot of twenty engines all but one will come down at once to the standard duty, while one will refuse to come below 26 or 28 pounds. This engine is made on exactly the same templates and with the same care as the other nineteen, and were it not for the test-room it would certainly be shipped as a perfect engine, in which case, if undiscovered, it would cheat the customer every day that it ran, and if discovered it would cheat the engine of its record and us of our reputation. When such a defective engine is found, the cause is persistently searched after and invariably removed. It becomes the manufacturer, therefore, to consider if he will himself assume the risk of getting a high duty, with possibly the expense of a costly expert test to demonstrate it, and with the ruinous alternative of taking out the engine, if a failure, or of putting up with its lack of economy as the least of two evils; or will throw the reponsibility wholly on the maker of the engine. It is probably true that the majority of the guaranties which are made are based on little else than the chance that the customer will never test the engine, or at worst will accept and pay for it rather than submit to the loss and delay which must follow its rejection and replacement by another engine. When the manufacturer purchases a Westinghouse Compound Engine he has in advance a positive certainty of the duty which he will get, the responsibility being taken wholly by the builder. If he wishes to make assurance doubly sure, our test-room is at his disposal, and he may satisfy himself in any way that he pleases, and accept or reject the engine

before shipment; not after its foundations are built and the engine erected, piped up, and its power becomes so vital a factor in his business that rejection is practically out of the question. Very respectfully,

WESTINGHOUSE, CHURCH, KERR & CO.,
Engineers.

17 Cortlandt Street, New York.
620 Atlantic Avenue, Boston, Mass.
156 and 158 Lake Street, Chicago.
Westinghouse Building, Pittsburgh.
608 Chestnut Street, Philadelphia.

TEST, No. 90. DATE, April 18, 1889.

OFFICE-RECORD.

No. of Engine	52
Class of Engine	Compound
Size of Engine	12 & 20 by 12
Maker's Name	Westinghouse Machine Co.
Tested at	Pittsburgh
Tested for	
Address	
Jacketing	None
Steam Lap	1¼ inches
Exhaust Lap	0 "

TESTER'S RECORD.		No. 1.	No. 2.
Number of Engine		52	52
Boiler Pressure	lbs.	100	100
Speed	rev.	300	303
Brake Load	lbs.	767	567
Time of Start		12.08	12.21
Time of Stop		12.18	12.31
Duration of Test	min.	10	10
Full Barrel "A"	lbs.	304	257
Empty Barrel "A"	"	100	100
Full Barrel "B"	"	302	257
Empty Barrel "B"	"	91	100
Vacuum	ins.		
Temperature of Discharge	deg.		
Water per hour	lbs.	2,490	1,884
Leakage per hour	"	34	34
Brake Radius	ins	27.75	27.75
Initial Pressure	lbs.	98	98
Terminal Pressure	"	9	6
Ratio of Expansion		4.71	5.38
High Pressure M. E. P	lbs.	51.	42.1
Low Pressure M. E. P	"	19.1	12.9
Indicated Horse-Power		106.94	80.89
Brake Horse-Power		98.67	72.97
Loss by Friction	H. P.	8.27	7.92
Percentage of Loss		7.73	9.79
Gross Indicated Water-Rate	lbs. per H. P. per hour.	23.6	23.71
Gross Brake Water-Rate	lbs. per H. P. per hour.	25.58	26.28
Spring	lbs.	40	40

REMARKS:—

Indicated by..........Bole.
Water weighed by..........Wilson.

SIGNATURE OF TESTERS.

W. A. BOLE.
NELSON C. WILSON.

THE PEERLESS BRICK COMPANY.

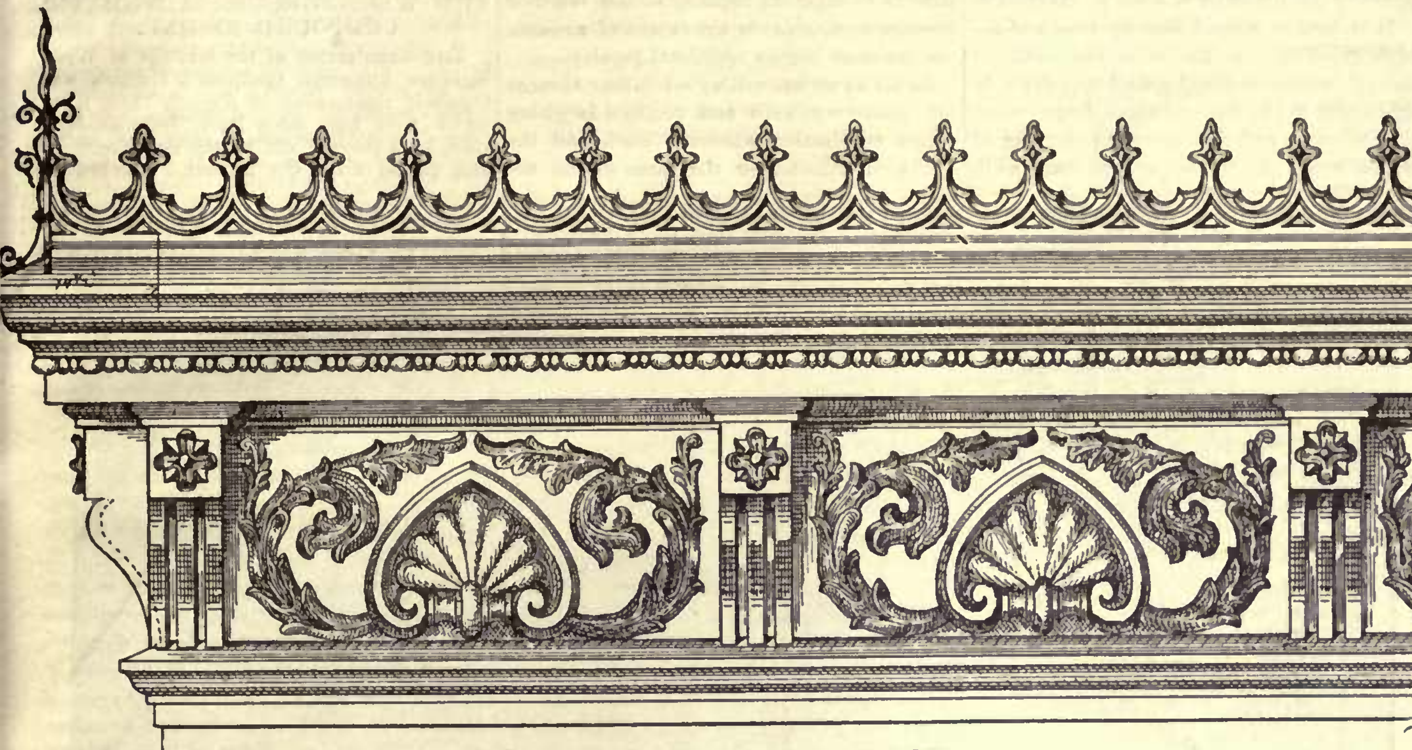
IN the new Master Builders' Exchange here, on Seventh Street, above Chestnut, there will be located some very important concerns connected with the building interest. Chief among the number will be the famous Peerless Brick Company, heretofore located at 1003 Walnut Street. By November 1st they will move to a suite of two spacious offices, just at the head of the stairs, on the second floor of the Master Builders' Exchange. The first floor of this building, it may here be remarked, is to be devoted entirely to a permanent exhibition of all materials and manufactures entering into the construction of our modern buildings, and the Peerless Brick Company will probably have the largest and most important display of the entire series. It will consist of artistically-arranged samples of the many shapes and designs and colors of the plain and ornamental bricks made by them, and also beautifully-constructed fireplaces and mantelpieces made entirely of bricks manufactured by the company. There is not the least doubt but the exhibit of the company will attract great attention, and be the means of materially stimulating the demand for their productions.

The Peerless Brick Company have been in business for about fifteen years past, and their business has from the first grown at a wonderful rate. The company started out with the expressed design of elevating the art of brick-making to the high position that it ought by rights to occupy in this enlightened age, and how well this object has been carried out is shown by the extent to which the "Peerless" bricks are used in such a number of the largest, most costly and most elegant buildings in this and other countries. And it is acknowledged by the most competent critics that the company's work surpasses in sharpness of angles and beauty of color and finish anything produced either at home or abroad. The company now make over 500 kinds of bricks, in shapes, ornaments and colors, by means of which the skilful architect can produce effects impracticable with other materials, and combining the desirable elements of indestructibility, elegance and economy. Even stone buildings are much improved, from an æsthetic point-of-view, by the introduction of the warm, rich colors produced in these bricks, and which cannot be had in stone.

The company's plant at Old York Road and Nicetown Lane, this city, comprises some 70 acres of land. The works are enclosed and heated, so that brick-making goes on all the year round. The capacity is from 15,-000,000 to 20,000,000 bricks per annum. The equipment of special patented machinery, etc., is the finest of its kind in the world. The business of the company, it may be added, is under the management of the following gentlemen: Wm. H. Melcher, President and General Manager; Chas. Henry Hart, Vice-President and Solicitor; G. R. Vogels, Assistant Manager; and J. B. Johnson, Secretary and Treasurer.—*Mercantile and Financial Times.*

CORNICES.

WE show herewith cut of cornice No. 371 which is taken from our new cornice catalogue. This catalogue is not ready for distribution at present, but we have advance-sheets that we are sending out to inquirers until we get the catalogue ready. These cornices, etc., are entirely new, and a complete departure from the style that has been in vogue for a number



of years, and they give an idea of what can be done in artistic sheet-metal work. We are making a specialty of statue-work, and have received orders thus far this year for about fifty. Among the most prominent of them, we would mention a copper statue of Hermann, 32 feet high, to go to New Ulm, Minn., for a monument being erected there by the Society of Hermann; a group for the Harlem Opera-House, New York City, and a group for the Court-House at New Ulm, Minn.; and groups for the new Court-House at San Diego, Cal., which also include heroic-sized statues of Washington, Lincoln, Grant and Garfield; and we are making a large number of signs for the Michigan Stove Co., which are said to be the finest display-signs of the kind in the country.

BAKEWELL & MULLINS,
SALEM, OHIO.

DEXTER BROS. *VS.* JOHN A. McDONALD PAINT AND GLASS CO.

JUDGE JOHN A. McDONALD, of the County Court, having spent much time and public treasure in the defence of injunctions brought to cause the body of which he is a member to tread the paths of righteousness and economy, will now devote time to his own personal litigation. To-day in the Circuit Court a petition for an injunction and $10,-000 damages against the John A. McDonald Paint and Glass Co. was filed by Dobson, Douglas & Trimble, attorneys for Franklin K,

and George B. Dexter, partners as Dexter Bros. The plaintiffs, who are paint manufacturers of Boston, Mass., set forth that they are the original makers of a valuable paint or stain for shingles, the trade-mark being "Dexter Brothers' English Shingle Stain." That they have advertised the product at great expense and caused the same to become widely celebrated and used. Two years ago they appointed John A. McDonald & Co. their Western agent, which business house was constituted of John A. McDonald doing business alone, and furnished the agent with large quantities of circulars, samples and advertisements to be scattered through the country. Subsequently Richard Hanrahan and William McDonald became associated with John A. McDonald in an incorporated company, which succeeded to all the business interests and liabilities of John A. McDonald.

It is further alleged that by reason of the high standing that the stain had obtained through advertising and actual use, John A. McDonald & Co. daily received large orders for the same, and that since the merging of the old house into the corporation many additional orders have been received. Plaintiffs also aver that, instead of filling the orders so received with "Dexter Brothers English Shingle Stain," John A. McDonald & Co. and the John A. McDonald Paint and Glass Co. supplied their customers with a cheap and fraudulent imitation manufactured by themselves, selling it under the name of and representing it to be the genuine "Dexter Brothers English Shingle Stain."

An injunction restraining defendants from further infringing upon plaintiff's copyright, and $10,000 for past damages in that behalf are asked.

The manner in which Dexter Bros. discovered the alleged bad faith of their agents was through a letter of complaint from a Kansas man who thought that he had purchased some of the genuine article. As the home company had never received an order from this section attorneys were employed to inquire into the situation. Ten gallons of Dexter's English Stain were ordered of the McDonald Co. and what purported to be that article was delivered. The attorneys for the Dexters state that the bill presented for payment was made out in the name of Dexter Bros. — *Kansas City Evening News.*

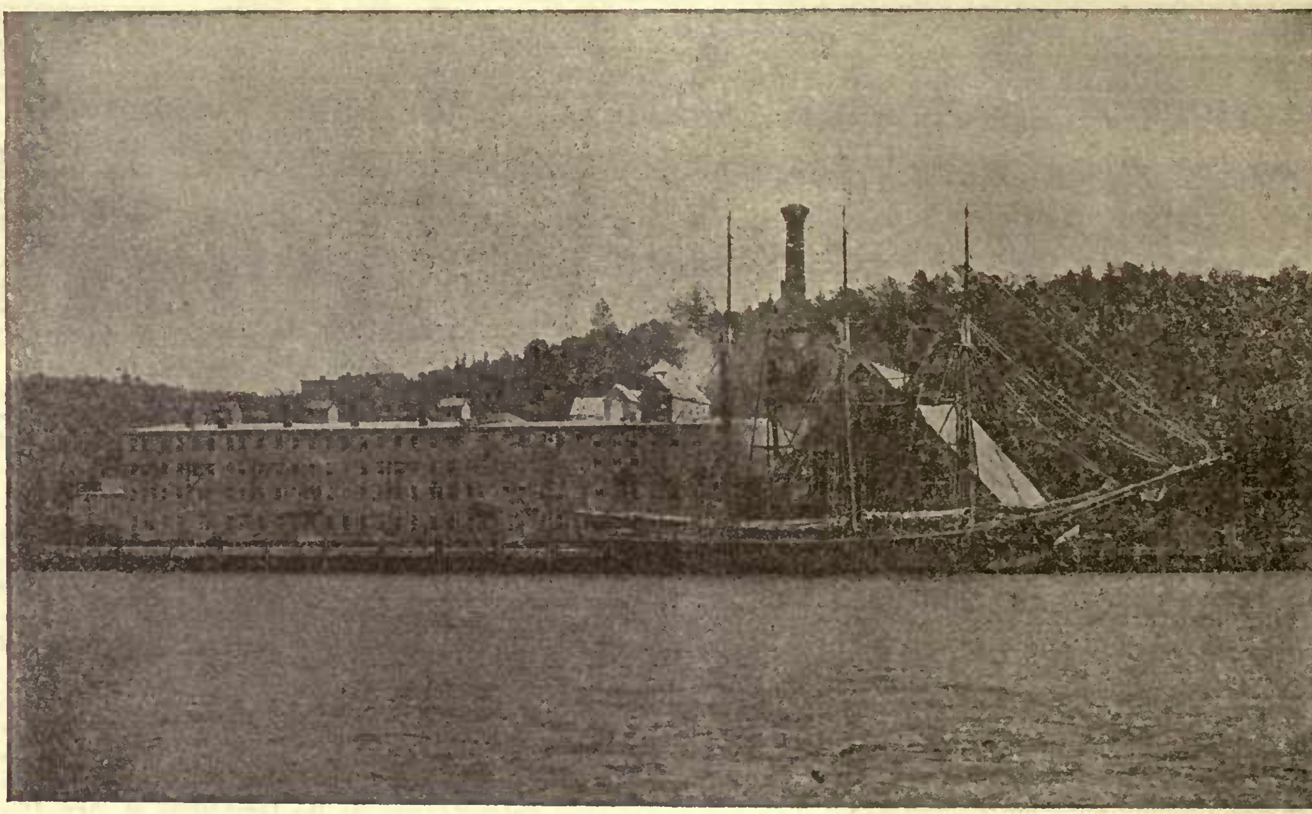
CEMENT.

The accompanying cut illustrates our factory which embraces the most extensive works for the manufacture of plaster and cement in the country. The accessibility of our works which are located on New York Bay, and easily reached by the largest vessels, has in connection with the energy and push which has been manifested in placing these materials on the market, caused us to determine to increase the capacity of the Windsor Cement department to the extent of at least, one thousand barrels additional per day.

So far as we know King's Windsor Cement for plastering walls and ceilings is giving entire satisfaction wherever used, and the increased demand for the same during the past few months is an evidence of the merits claimed for it.

J. B. KING & CO.,
24 State Street, New York, N. Y.

The Works of J. B. King & Co.



The motion for an injunction in the case of the Bridgeport Wood Finishing Company *vs.* the New York Wood Finishing Company came on to be heard before his Honor, Judge Wheeler, in the Circuit Court for the Southern District of New York, Friday, November 15th, and was argued by S. J. Gordon, Esq., for the complainant, and Albert Comstock, Esq., for the respondent. The judge reserved his decision, but handed it down the next day, sustaining the Wheeler Patent and ordering the injunction to issue.

SHOP-LIGHTING FOR NIGHT-WORK.

The Westinghouse Machine Company is engaged in putting an electric-light plant into its establishment, so arranged and of such capacity, as will make these works (if such a thing be possible) as light by night as they are by day. A combination of incandescent and arc lights will be used for the purpose. The former will be effectually distributed over the whole area of each department, and these will be supplemented with arc-lights in all large spaces.

The Company is adding a complete force of night workmen, and as it is believed these workmen will henceforth here find continuous employment, it becomes important that the establishment shall have a permanent, abundant supply of light. If each machine is lighted independently, it is found that workmen cannot move about the shops to advantage in the gloom, and, in short, cannot do as much work as the same force would by day. A reduction in product of only two per centum on a large force is important, and to save this on a night force is well worth the cost of maintaining a brilliant, abundant, general illumination of the establishment, if it can successfully be done.

THE WESTINGHOUSE AUTOMATIC COMPOUND ENGINE.

The manufacture of the first size of Westinghouse Automatic Compound Engines was regularly commenced in August, 1888, since which time nine sizes have, from time to time, been brought out by the manufacturers and placed upon the market. As 196 of these remarkable engines, aggregating more than 20,000 horse-power, have been sold in the intervening fifteen months (a record which, it is perhaps safe to say, has never been equalled in the engineering world), we have procured for the benefit of our readers, an authentic statement of the peculiarities in design, by means of which the great fuel economies of these engines are obtained, and which economies, of course, are the principal secret of the large and rapid sales.

In covering the invention with patents, in the various countries of the world, The Westinghouse Machine Company was compelled to prepare very elaborate descriptions of the invention in all its details, and it is one of these (abbreviated as much as possible) that we now submit to our readers.

In the hitherto accepted practice of steam engineers, it has been considered that, as relates to compression and clearance, two rules were inevitable and necessary to the highest economical performance: First, that clearance should be reduced to the smallest attainable volume; and second, that compression should fill this clearance with exhaust steam com-

pressed up to the initial pressure. To this end, the efforts of skilled designers of steam engines have been directed towards such relative arrangements of valves and cylinders as should give the least possible clearance. The builders of engines possessing a small clearance have made this fact a leading claim for excellence, and engineers generally have made a large clearance the basis of criticism in all engines. Our invention, on the contrary, is based on the discovery that clearance, rightly controlled, need not be small, but large, and of a determinate volume. In steam engines having the exhaust valves independent of the steam valves, it is possible to maintain a minimum clearance and a fixed compression, which compression, however, being fixed, is not a function of a variable initial pressure, and can, therefore, only approximate correct action under limited circumstances. In a steam engine, on the contrary, controlling both its steam and exhaust functions by single valve and valve motion, it is apparent that the compression will vary over a wide range coincident with the variation of the point of cut-off. It is, therefore, manifest that the two conditions of full compression and minimum clearance become immediately antagonized and impossible of simultaneous realization, except at one point of cut-off and initial pressure. If the valve mechanism be so adjusted as to give a perfect joint result at a given point of cut-off and steam pressure, it will follow that two sources of loss are inevitable from a variation in either direction: First, if the load increase from a given point, the compression will be reduced and a loss of economy will result from the failure to restore the temperature of the inner surfaces of the cylinder, and from the failure to fill the clearance space with a full initial of steam saved from that which would otherwise have been exhausted. Second, if the load decrease, the compression will increase above the initial pressure of the steam, constituting a resistance equivalent to a non-productive load upon the engine. From these alternatives there has heretofore been considered to be no escape.

For a theoretically correct performance, it is necessary that means should be provided for effecting a variable degree of expansion over the entire range of the governor and under every variation of steam pressure with which the engine may from time to time be operated; while, at all and the same times, the compression pressure should be exactly equal to the initial pressure, varying with it only as the boiler pressure rises or falls, but not varying at all for any variation of load.

In the course of the investigations and experiments which have led up to the present invention herein described, we have discovered that the desirable result above indicated can be attained with great exactness and controlled with certainty by the proper combination of a single valve and single eccentric valve motion, with a certain definite and pre-determined volume of clearance, which clearance is at all times in communication with the high-pressure cylinder, but periodically cut off from the low-pressure cylinder. Stress is laid upon the fact that the clearance volume is not indeterminate or constructive, but is an exact and determined volume, being a function of the total volume of the high-pressure cylinder; and, further, that this clearance volume is greatly in excess of that required merely for the transmission passages of the steam, and must, therefore, be arbitrarily provided for in the design of the engine. We have demonstrated that an engine possessing a relatively determined valve motion and clearance volume, as above described, will permit of every variation of steam pressure and point of cut-off, while retaining a fixed compression curve terminating always at the initial pressure of the entering steam. It has further been demonstrated that the economical results from such an engine are superior to any as yet attained in practice; and, so far as our knowledge and information extends, similar results are not possessed by or obtained from constructions existing or proposed prior to our invention.

THE WESTINGHOUSE MACHINE CO.,
PITTSBURGH, PA.

OTTO GAS ENGINE AND PUMP COMBINED FOR HYDRAULIC ELEVATOR SERVICE.

THERE is, during summer and spring seasons, often complaint made by the tenants and visitors of our large office-buildings over the heat, odor and coal-dust arising from the basements, where boilers are kept going to supply the power required for elevators or pumps. The steam-heat, which is such a comfort in winter, becomes a nuisance in summer time. It serves the purpose to supply power to the elevators, and can, therefore, not be stopped. Many owners of buildings have stood before this dilemma, but have not been slow in solving it by using gas-power for elevators and pumps, and low-pressure steam in winter for heating. They have felt benefited by the more simple and safe appliances of this combination, and also have saved in fuel and cost of attendance, as less skilled attendance can be used, and the care for the machinery need not be so continuous and constant, nor involve the responsibility of high-pressure steam for heating and power. In consequence of this gas-power, pumping plants of considerable capacity are no rarity, and the running cost of some fifty of them in Chicago was found to average only $28.80 per month and for each hydraulic elevator.

For apartment-houses or private residences, where hydraulic elevators are now frequently introduced, the Otto Gas-Engine Works have designed a combination pump and engine. The capacity is of about 2,500 gallons per hour for a height of about 100 feet, and the pump is driven by belt in a noiseless manner. It is also provided with the well-known by-pass valve used on the combinations of heavier capacity, and by which the delivery of water is kept in proportion to the needs of the elevator. Many architects have doubtless felt a want for a gas-engine pumper of moderate capacity, and will certainly welcome the new size and design.

SCHLEICHER, SCHUMM & CO.,
33RD AND WALNUT STS., PHILADELPHIA, PA.

NOTES.

THE engine sales reported by The Westinghouse Machine Company have reached high-water mark during the month of October, 1889. They are the largest in the Company's history, and are as follows:

35 Junior Engines,	1,095	Horse-power.
32 Standard Engines,	1,395	"
43 Compound Engines	3,545	"
110 Engines, aggregating	6,035	Horse-power.

As proof of the superiority of their Boston Front Brick (fireproof), as compared with stone or common red brick, when subjected to excessive heat, Messrs. Fiske & Coleman of Boston point to the condition of the exterior walls of the New England Shoe and Leather Exchange Building, now in process of construction, corner Bedford and Kingston Streets. In the recent fire, these walls, while intensely hot, were subjected to the continuous application of water, sudden expansion and contraction resulting that would have been disastrous to any other material, yet they are in perfect condition.

THE Whittier Machine Company have recently put into the building occupied by Messrs. Mabley & Carew, in Baltimore, Md., and into the Municipal Building at Brooklyn, N. Y., an hydraulic elevator for passenger service operated by their pressure-tank system.

Publishers' Notice.

OUR Subscribers are requested to notice the terms (as stated in our issue of Nov. 9) upon which our extra plate for the coming year will be issued.

To all prepaying subscribers who

subscribe direct to us

it will be sent upon the following terms:—with the International and the Imperial editions free, and with the Regular edition upon receipt of fifty cents extra. These terms are for our direct subscribers only.

Those who send their subscriptions through other channels to us can obtain the plate by sending us one dollar. To all others the price will be three dollars.

We have decided to print the Engraving upon heavy Japan paper, 18 x 24, instead of common plate paper as first announced, and it will be issued as a supplement with our number for January 18, 1890, upon the above conditions.

TICKNOR & COMPANY,

Publishers "The American Architect."

Boston, Dec. 1, 1889.

Important to all our Readers.

As explained editorially, we have decided to give special attention to increasing very largely the number and scope of the illustrations contained in the *American Architect.* To do this, it will be necessary to increase the subscription price, but *only to those* who desire the increased illustration. We shall, therefore, continue the "Regular" and "Imperial" editions in their present forms, as *per* our Prospectus, and issue, in addition, an enlarged and more expensive edition, to be called

"The International Edition."

The name indicates the scope of the new issue. The "International" will include all that the "Imperial" contains (that is, the equivalent of 384 pages of photo-lithographic illustration of all sorts, also 40 gelatine and 12 heliochrome plates and the extra photogravure plate for the year) and will add (A) a large amount of the very best foreign work, new and standard, which we have arranged to obtain regularly from England, France, and Germany, directly from the best sources. The apportionment of this new matter is not yet definitely fixed, but it will amount approximately to over 200 pages of photo-lithographs and nearly 150 gelatine plates. Should it seem desirable later to alter the proportions by giving more gelatine and less lithographic work, we shall do so, giving our subscribers the full equivalent value in the substitution.

To give still further value to this edition, we shall publish, from time to time (B) additional colored prints and also (C) *real* photogravures, — not every-day steam-press gelatines masquerading as photogravures, as is so common in America to-day, — but the *genuine copperplate etchings*, such as are issued by Messrs. Goupil in Paris by that name, and which are the only plates properly so designated.

But the feature that we consider the most interesting to the American profession will consist (D) in publishing in this "International Edition," as far as our subscribers will aid us to do so,

Competitive Designs

submitted in limited, and in some cases in public, competitions. Heretofore we purposely have made no attempt to lay before our readers designs submitted in the many interesting competitions that continually take place, for our limited space has precluded this except by extending them through several successive issues, to the exclusion of other matter, injuriously perhaps. We have always regretted that we could not publish this competitive matter, believing that if our subscribers could have the designs submitted in a given competition PUBLISHED ALL TOGETHER IN ONE ISSUE within a reasonable time after the decision of the competition, they would consider it the most interesting matter we could offer them, — a judgment that is more than confirmed by the intense interest shown in the New York Cathedral competition which we are now publishing in special issues.

We shall therefore take advantage of the new edition to give, in the American department of the enlargement, the equivalent of eight pages of illustration once a month, to be devoted to this purpose. This, with our present space, will give fourteen pages, enough to accommodate a very fair representation of the designs submitted in any given competition.

As the carrying out of this part of our programme depends *entirely on our subscribers*, we can make no definite promises further than to say that if they will interest themselves so far as to keep us notified what competitions are going on, and will furthermore furnish their own designs so submitted, we will on our part provide the additional space as above for printing them.

To do all this — to provide a journal containing approximately

1000 Illustrations

(besides (E) an attendant increase in the text of four pages weekly, two hundred pages per annum) — will of course require a considerable increase in the subscription price, and we find that it cannot be placed at less than $25.00 per annum. At the same time, to place it within reach of many to whom so large a single payment might be an inconvenience, we will accept quarterly payments, when preferred, at the rate of $26.00 for the entire year, in quarterly instalments of $6.50 each quarter, in advance. *No subscriptions will be received, however, for less than the full calendar year*, as the plan involves contracts in at least three foreign countries, which must be made upon a permanent basis by the year.

Unexpired subscriptions to the other editions will be credited with the amount due them on making the change.

We trust that this proposal will commend itself to our readers, for we are confident of making

"The International Edition"

of the *American Architect* the most complete and comprehensive journal of the class *in the world*, giving every week the choicest and best work of Europe and America, and obviating the need for many foreign papers now taken at much greater expense.

It is necessary to know as speedily as possible what number of subscribers can be secured for this "International Edition," because our importations of foreign plates must obviously be for a definite number, and after the edition is once subscribed for, it will be impossible to furnish any back numbers. We invite all intending subscribers to send their subscriptions *as promptly as possible.*

TICKNOR & COMPANY,

BOSTON, Dec. 1, 1889. *Publishers "The American Architect."*